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NEW YORK, SATURDAY, APRIL 3, 1920

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The Sale of Kompak Automatic Water Heaters Has Saved Gas Companies

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Automatic Storage Water Heaters

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Chicago By-Product Coke Company's New Plant

To Consist of

Koppers Combination Coke and Gas Ovens, By-Product Plant and a Koppers Water-Gas Plant with a Minimum Daily Capacity of 30,000,000 Cu. Ft. of Gas

Will Be Built by

The Koppers Company

PITTSBURGH, PA.

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Gas Industry Vitally Interested in Equalizing Coal Demand Over Twelve Months of the Year

Increase in Industrial Business Has Brought a New Problem in the Coal Supply Factor That Will Become Increasingly Acute as This Load Grows Proportionately Larger

By L. W. ALWYN SCHMIDT

It is an unfortunate fact that every form of progress also causes immediately a new set of problems. The coming of the automobile necessitated a revolution of our road system, the many problems caused by the invention of the flying machine have not been solved yet, and the problems of the gas industry caused by the introduction of new methods, although minor possibly in character, are great in number. Now comes the increase of industrial gas consumption and introduces a new lot of problems which require an early solution. To decline progress because it cannot be won without trouble to ourselves no doubt would be a very foolish procedure. In fact, it is not the problem itself that we have to fear, because a solution can be provided for any difficulty, but its belated realization so that it may be guarded against in time.

How the Coal Need Is Distributed

The increase in industrial gas consumption is a matter certainly to be welcomed from many respects. The experience during the last years has shown already that industrial gas consumption can be made extremely useful for the gas works and that the income derived from it excels in steadiness above any other source of income enjoyed by our gas works. If gas managers will go to the trouble of analyzing their industrial accounts they will find that there is only little variation in the income from the industrial consumers during winter and summer. This gives to the gas works a fundamental earning power that "must be known to be appreciated," as the saying runs. Many gas works, therefore, have set out to increase this source of income by catering systematically for the business of the industrial consumer until industrial consumption has reached about two-thirds of their summer load, or even more. It is this increase in the percentual relationship of the industrial consumption to the total consumption which now has produced the particular problem referred to in the introduction of this article.

Take the case of a gas work operating in a well-populated industrial district with a mixed clientele of consumers from the industrial and domestic field. If this gas work should need 12,000 tons of coal every year (the figure is entirely hypothetical), the consumption would be distributed approximately as follows:

	Tons.	Per Cent of Total.
May	800	6.6
June	600	5.0
July	600	5.0
August	800	6.6
September	900	7.5
October	1,000	8.3
November	1,200	10.0
December	1,500	12.5
January	1,500	12.5
February	1,100	9.1
March	1,100	9.1
April	900	7.5
	12,000*	

*1,000 tons of coal per month have been selected because the figure can easily be applied to any actual condition by multiplying it as required.

The industrial consumption of this gas work may have necessitated in the past an average purchase of 300 tons of coal during the six summer months and an average 400 possibly during the winter months, allowing for the increase in consumption of gas for lighting the establishments. The coal purchase policy of this plant, therefore, cannot have offered any special problem. If, for instance, the plant has been in the habit of making arrangements two months ahead it was no doubt pretty safe when ordering approximately on the basis of the above statistic of consumption.

During the last year great efforts have been made by many gas works to increase their industrial demand above the former levels, and this no doubt will begin to bring results during the coming year. The chances, therefore, are that the summer consumption of coal will

increase very much above that of the former years. If, for instance, this particular plant should find that its industrial consumption has jumped to a level of 40 per cent of its winter load, excluding consumption for lighting industrial plants, as is the case in many mixed industrial districts, it follows that its summer consumption of coal will be increased correspondingly. It would be 825 tons during the lowest summer months and the consumption of coal caused by the industrial demand would influence the coal shipments all through the summer; in fact, through all the year.

Industrial Gas Consumption Gains Momentum

It is this special aspect of the situation which most likely will cause a good deal of trouble in the coal purchasing offices of our gas companies. The campaign in support of industrial gas demand that has been carried on now since several years is slowly gaining in strength and is producing new results every month. There will result, therefore, not a reduction in industrial demand, but this is bound to grow from month to month, and the coming summer most likely will see further additions to the number of the industrial consumers of the gas industry. How is a gas works, like that assumed for the purpose of this explanation, to deal with this situation?

I am not dealing here with the problem of capacity but with that of coal supply merely. The increase in the summer load most likely will be welcome to many gas works, but they will not enjoy as much the increase in the winter load that must be the direct outcome of the increase in the industrial load. This load is not an elastic one like the domestic load, but a permanent drain upon the coal resources of the enterprise and must be taken care of in ordering the coal for the winter. It means in plain words that our gas works will have to buy just as much more coal during the winter, 1920-21, as their industrial load has increased during the summer of the present year.

The new industrial load in the form in which we are building it up just now, therefore, is no entire blessing if not taken care of in our national coal distribution policy.

A Sound Policy for Security

The experience of recent years has shown that we cannot trust implicitly to the proverbial luck of democracies in the handling of their national economic affairs. We have gone through a series of national coal famines, and our public utilities have had to carry their share of the trouble of the consumer of industrial materials. There have been times when large gas plants have been operated with only a few days' supply, and there is the case of the New York subway system that had actually to shut down for a few hours, because it had no coal for its dynamos. So the nation has awakened to the necessity of reorganizing its means of production and distribution upon a basis less amenable to chance. The customers of the gas works demand that a reserve of coal should be collected sufficiently large so as to protect the consumer against the danger of a sudden shortage. This is recognized by most gas works, and steps have been taken already to remedy the situation. Many gas works have increased their storage facilities and these are filled up slowly so that they may serve as an effective reserve in times of need. The problem of the gas works becomes in this manner part of the greater problem of the national coal reserve. It is clear that any gas works that has increased its industrial consumption in the manner suggested cannot expect to operate with the same coal consumption as during the preceding year. Where it has required 12,000 tons in the past, it will have to add at least another 2,000 tons to its total coal purchases to take care of the added industrial consumption. Multiply this instance several hundred times, as must be the case in any mixed industrial neighborhood where there are large industrial communities, and you get a proper view of the size of the national problem that is involved in the question of increase in the industrial gas consumption alone.

It may mean the moving of additional millions of tons of coal during that time of the year when coal movements are heavy already, and where traffic is most likely to be interrupted by the vagaries of the weather.

One Solution Only for Coal Problem

There is only one solution of the situation. This is that our public utilities will have to fill up their coal bins during the summer to take care at least of the industrial consumption during the winter months, trusting that the regular supplies will take care of the needs of the domestic consumer. If 2,000 tons of coal, for instance, is all that will be required to safeguard the industrial gas consumer in the district, these 2,000 tons should be purchased in the spring and should be moved to the gas works during the months of April, May, June, July, August, and possibly September. If our gas works, instead of making its April order 900 tons, would raise it to 1,100 and would continue at that level until September, it would have sufficient coal to take care of the industrial consumer, and there would not be any shortage to be feared during the winter on account of the remaining industrial load. Incidentally, a very useful equalization of the coal movement of the whole country would be brought about which can only be of a beneficial influence upon the national transportation system.

This whole question of equalization of coal production and distribution has now been taken up seriously, and has found discussion in the coal industry and among coal merchants. The gas industry is one of the biggest individual consumers of coal and it is, therefore, vitally interested in the outcome of these discussions.

As far as the gas industry is concerned, nobody will contradict most likely the facts as stated. They are known well enough to anybody connected with gas making in this country. But to realize the need for a change and to be willing for the actual experiment is not always the same. The gas industry especially is conscious of many great difficulties that will have to be removed before the change can be entertained seriously.

It may be taken for granted that all gas companies will follow a very conservative policy with reference to their coal reserves during the present year. Wherever possible, coal reserves will be collected and held in readiness for the winter months. But the attempt even in this small and unorganized form is taxing the financial resources of many gas works far above that which they can stand. The gas industry just now is not a very prosperous industry and has to collect its earnings from the pockets of millions of small consumers.

Its earnings are especially low during the summer months, just when the money would be required for making the additional coal purchases. To follow such a policy in fact would necessitate for many gas works either the increase of their capital or the taking up of considerable banking loans that are not easily obtainable under present conditions, where banks are beginning to retrench.

But the banks will have to help if they want order and security to come into the industrial life of the community. The creation of a banking organization willing to finance the coal turnover necessary for completing such a scheme of national summer coal storage, therefore, is the principal requirement.

The American gas industry has an annual coal expenditure amounting to $100,000,000, approximately, at present-day prices. Taking the average monthly coal consumption of the industry, as indicated in the statistics above as approximately representative and correcting it under the aspect of the expected increase of industrial consumption, the gas industry would have to pay $7,500,000 every month during eight months of the year, the remaining $40,000,000 to be distributed over the four months of highest domestic and industrial consumption during the peak of the winter season. But a large part of the summer expenditure consists in the coal purchased for the immediate needs of the consumer, and $20,000,000 in fact is all that will have to be covered by transferring the coal purchase from the winter months to the summer months. These $20,000,000 have to be found for the uses of an industry which has a capitalization of well over a billion and a quarter of dollars, and a production of $300,000,000 approximately, if not more. Against its loan can be offered the extensive holdings of property of the American gas industry, which certainly should make a sufficient security to any banking combination, quite apart of the national considerations which make advisable such a policy.

What the Banks Can Do

If the banks can be interested in the matter, and there seems little doubt that they will be ultimately, the transaction will be carried out approximately as follows: The mines will have to mine more coal during the summer than they do at the present time. It has been estimated that in all 50,000,000 tons of coal will be affected by the system of equalization of production and distribution. But less will be mined during the winter. The additional coal that is mined during the summer is destined for storage purposes only. As the consumers may not be able to pay for it immediately the risk of the transaction will be distributed over all the stages from production to consumption. As far as the gas works are concerned these deal either with the mines directly or through the agency of a wholesale distribution. In the first case the credit arrangement will lie between the gas company and the mine. The mine will sell, therefore, the coal against the receipt of a bill of acceptance that should mature approximately at the time when the gas company is able to collect for the gas that has been manufactured from the coal. The bill most likely will not be drawn for the whole length of the credit term, but for three months dating, for instance, from the first of May, to cover the April shipments, to the first of August. The sum of this first carry-over represents in the hypothetical case 200 tons of coal; to this is added another bill in May maturing September, covering the purchase of 300 tons which also are taken in storage. The biggest amounts are involved during the months of June and July when the actual sales are at their lowest. By the beginning of August 1,500 tons of coal are lying in reserve in this manner in the coal bins of the company involving a corresponding bank loan. By that time also the first bill of $200 comes due, which is met from the cash balance of the bank, and a new credit is obtained upon the security of the 200 tons of coal that formed the basis of the May credit. From August the credits decline again, and with the beginning of November the time is reached when the August commitment can be cleared without recourse to new banking accommodation. By April first the whole credit should be wiped out entirely and the transaction is ended.

It will be seen that the whole system when put into operation requires a fairly correct estimate on the side of the gas company as to its coal needs during the winter. The estimate must be made during the early spring, and the likely amount of industrial business that will accumulate during the summer must play an important part in the plans of the enterprise.

Stopping Wastes in the Boiler Plant

Loren L. Hebberd Outlines Some of Them and Suggests Means of Improving Efficiency

The cost of coal should be judged on the basis of cost to produce a thousand pounds of steam, not on the basis of cost per ton of coal, contended Loren L. Hebberd in a paper before the annual convention of the Wisconsin Gas Association.

A useful instrument and an inexpensive one, too, is a draft gauge. The type of gauge and method of connecting it would depend on the local conditions. Where forced draft is used it would pay to have a recording draft gauge connected to the furnace and the fireman should regulate the drafts so as to maintain very nearly a balanced draft over the fire. Such a gauge would be a continuous check on this regulation.

A steam flow meter on each boiler is very valuable because it shows the fireman how well the load is distributed and which fire needs attention to bring it up to doing its share of the load. Otherwise, the fireman will go down the line fussing with each fire and probably doing more harm than good to the fires that are already doing well and not paying sufficient or proper attention to the "lame duck."

A recording pressure gauge is a good thing not only for the use it may be in maintaining efficiency, but to settle disputes. A department head cannot blame low production to low steam pressure if the recording gauge shows that the steam was maintained up to normal pressure.

Value of C. O.² Instrument Depends on Man

Both an indicating and a recording thermometer should be placed in the boiler feed line. The latter to show graphically the temperature during the entire twenty-four hours and the former to check the recorder. In almost all plants there is enough exhaust steam to maintain the maximum feed water temperature. Every eleven degrees gain in feed water tempera-

ture is a saving of one per cent of the coal so it is very evident why this should be watched closely.

Some means should be provided to show the temperature of the escaping gases as this is a prolific source of a considerable loss. High stack temperatures may be caused by dirty tubes either inside or outside; by leaky baffles on a water tube boiler, which permit short circuiting of the gases; and by poor combustion. This latter might be caused by either of two extremes, excess air with a resultant high velocity through the tubes or insufficient air with the formation of C. O. and secondary combustion in the boiler or breaching. There are several ways of measuring this temperature such as the use of a mercury thermometer and periodic readings, or a permanently installed pyrometer either indicating or recording. Some combustion engineers claim that the stack temperature in conjunction with observations of the boiler and fire tell them more about the operating efficiency than any other instrument.

The use of C. O.$_2$ instruments depends very largely on the ability of the man behind the gun. If he is capable and gets the results which are possible, it would be advisable to have a recording C. O.$_2$ analyzer. There are several such instruments available which have been perfected to a point where they are simple and reliable.

Finally the system of investigation, use of instruments, etc., should boil down to a periodic report of the operating results and costs. Whether this report be daily, weekly or monthly will depend on local conditions. Also the size of the plant will determine the procedure to a certain extent. It is obvious that a small plant cannot be burdened with too much expense so that the saving will not pay the cost of obtaining the saving. The definition that engineering is a scientific application of good common sense applies very aptly to this problem. One definite thing which should be covered by this system is a periodic statement of the amount of steam produced, the unit cost and such other data as will permit the management to see readily how the boiler plant as a department, is progressing. For instance, the summary might show how many thousands of pounds of steam were produced, how many tons of fuel burned, the cost per ton, cost of other items, such as labor, repairs, etc., and finally, the cost per thousand pounds of steam. These figures can be made still more useful by determining the consumption of steam per unit of product.

Another step in a cost system is to determine the quantity of steam used by each department and charge them for the total cost of producing this steam in proportion to the amount they use.

When this first step toward better results has been accomplished, that is when it is known what results are being obtained and the instruments are available for further investigation, then the second step is to locate the wastes and stop them. Progress along this line will be indicated by the periodic reports and unit costs. Better efficiency of the boiler itself will be shown by a higher evaporation and therefore a lower coal consumption. Study the method of firing. One thing that is sure to bring results is frequent firing periods and only a small amount of coal at each firing. Keep an even fire and regulate the damper according to the load. Care of these points will result in a better C. O.$_2$ Keep the boiler tubes free from soot and scale. Also see that the baffles of a water tube boiler are in good condition. Watch out for air leakage in the setting. Cracks in the brickwork and around cleanout doors should be plugged up. It is also a good thing to paint the entire setting with one of the several compounds on the market intended for this purpose. Ordinary whitewash is better than nothing. Stopping those air leaks will help greatly toward better efficiency. If the fire is in good condition and the drafts set properly and the C. O.$_2$ is still low, then you can be sure that air leakage is responsible.

The Leaky Steam Trap

Other items of losses both in the boiler room and throughout a plant are leaky steam traps, leaky boiler blowoff valves, small steam leaks at flanges and stuffing boxes, etc. These do not seem to amount to much but they continue twenty-four hours a day and it does not take many of these apparently small leaks to amount to a considerable loss in a year. A one-eighth inch round hole with 100 lb. steam pressure will waste approximately $250 per year. One leaking steam trap could easily waste this quantity of steam. Pipe covering is an investment which will usually pay for itself in one year. Particular care should be paid to the insulation of outdoor lines, both overhead and underground. The best of underground conduit is none too good and usually the most important item of underground construction is proper and efficient drainage. It is a common trick of operating men to crack a valve at the end of an outdoor line to prevent freezing in the winter time. This practice will cost far more than proper design and installation, so as to eliminate any need of such a wasteful makeshift.

Another important item of overall plant economy as regards steam, is the utilization as far as possible of exhaust steam. The feed water heater should be supplied with sufficient exhaust steam to maintain at least 208 deg. Fahr. at all times. The heating of buildings should be done with exhaust and there are usually a number of other ways of using exhaust steam, rather than live steam. This low pressure steam has nearly as much heat in it as high pressure steam and it is usually possible to design the plant to use every bit of exhaust steam available.

The final step toward an efficient plant is to see what apparatus is needed or what changes in the present apparatus will pay for the investment in improved economy. Under this heading should be considered coal and ash handling apparatus, feed water heaters, mechanical soot blowers, feed water regulators, feed water pumps, oil separators, water softening, mechanical stokers and even the building of a complete new plant.

The advisability of coal and ash handling apparatus and overhead bunkers is determined largely by the size of the plant and the saving in labor. It is obvious that if you cannot save enough labor to pay the interest on the investment, then there is not much reason for the installation of such machinery.

A feed water heater is one of the most important auxiliaries in a boiler room. A good heater should always be included, except in cases where a "back to boiler" trap system is used. The feed water heater should be of sufficient size and kept in proper operating condition to supply hot water within a few degrees of the exhaust steam temperature at all times. In the average plant more or less of the steam from the boilers is returned to the heater and this is already fairly hot. This includes trap returns and condensation from the heating system, and sometimes from process work of

(*Continued on page* 262.)

Obtaining and Holding Commercial Gas Lighting from the Company's Point of View

Charles A. Pepper Tells How by Using Best Efforts to Secure Lighting Consumers, Sheboygan Company Can Now Boast of Stores in the Main Business Section of the City That Are Gas Lighted and Best Lighted in the State

Sheboygan, with a population of 35,000, cannot be classified as either a purely industrial or purely commercial city. It is a combination of both. Situated on Lake Michigan, in the heart of a prosperous agricultural region with dairy products valued between $8,000,000 and $9,000,000 annually, it is something of a trade.

Its manufactories are very well developed and there are many so-called industrial and commercial cities of less importance than Sheboygan.

The merchants of our city have always advanced a certain amount of pride in the manner of displaying their wares. To properly exhibit their goods, appropriate store and window lighting is very essential, declared Charles A. Pepper, in a paper at the annual convention of the Wisconsin Gas Association.

The main business section of our city, which includes North Eighth Street and Michigan Avenue, have some of the best gas lighted stores in the State. We boast of this fact primarily for the reason that among our neighboring cities gas has become obsolete as far as illumination is concerned. This is especially true with combination companies. It has been our custom in recent years to use our best efforts in obtaining lighting consumers.

Solicitors Kept in Field

We have maintained the idea that it is absolutely necessary to keep solicitors in the field for new business, as well as holding friendly relations between the consumer and the company. The salesmen, in covering their territory, keep in touch with the new occupant of the vacated store, and while the alterations are in progress the prospective consumer is approached on the advisability of gas for lighting. Our outlying districts contain several smaller business centers, and the merchants are just as enterprising as the center townspeople regarding displaying goods and well gas lighted stores. We are often commended by salesmen who make regular visits to our city that notice the many well lighted stores that are using gas service for illumination.

The most essential facts in favor of obtaining and holding commercial gas lighting are first a good quality of gas and, secondly, proper maintenance of units after such business is obtained.

Methods of Payment

Our plan of campaign for new lighting business, as adopted in 1915-16, was to solicit the prospective consumers and sign up contracts or leases for as many gas arcs required for their respective place of business. The agreement entered into between the company and the consumer was the purchase of the lamps under the following conditions:

A 3-mantle gas arc installed for the sum of $17.50 with payments of 50 cents a month per lamp for thirty-five months. In other words a fixed charge of 50 cents per month, one-half of this amount credited for payment of arc and the other one-half applied for maintaining. At the expiration of thirty-five months the arc becomes property of the consumer. The sum of 25 cents per month is then collected for arc maintenance, the consumer having the choice of either the daylight alabaster or one-quarter ground ball globe for his requirements. We recommend the daylight globe for eye comfort and economy, but in several cases the clear glass ball globe is preferable on account of the wide range of distribution, the consumer being desirous of all the light obtainable.

Importance of Maintenance

Another point worked out was the fact that no arcs were sold unless under our maintenance contract. Every arc lamp is properly trimmed once a week by a competent maintenance man. The consumer signs his slip in the book carried by the lamp inspector, showing that a call has been made and also for check on the trimmer. The arcs are property of the company until paid for and in case of a consumer vacating a building with a balance due on the arcs, the lamps are left in and sold to the new tenant. The incoming merchant is not so apt to wire up and is more liable to use the present installation of lighting by leaving the gas arcs hang from the ceiling, pending the signing of the payment and maintenance contract for the arcs installed and the application for meter. In this way we obtain leads and follow-ups for the commercial department to work upon, also collecting balance due from the old consumer and soliciting new business from the prospective consumer. Our merchants are of the old stand-by type, permanently located, and we seldom are troubled with transient fly-by-night consumers. When once a gas arc is installed, we are involved with a satisfied consumer, always emphasizing how essential it is to give good service if care is taken to insure good installations, avoiding if possible complaints such as pilot outage, broken mantles and proper adjustment of burners.

Following the Plan of Selling the Arc

It is well worth while to encourage commercial gas lighting with campaigns and constant solicitation for future business and take necessary precautions to obtain a good grade of glassware, mantles, etc. During the war period we were not so fortunate in getting good material and complaints of breakage were very numerous, but after weathering through this source of trouble we are prepared to give better service in obtaining and holding commercial gas lighting.

In adopting the 3-mantle Humphrey No. 30 Radio Arc in 1915 as our standard, eliminating the several old style upright arcs, we find we cut the cost of mainte-

nance. These arcs are used in some of the best business places in our city, among which are furniture stores, jewelry stores, restaurants, buffets, drug stores, department stores, auto display rooms, factories, newspaper offices, laundries, amusement halls and the like. These arcs are not used for emergency lighting, in most cases gas being used exclusively for illumination. The writer can recall several prosperous and enterprising merchants that have used gas exclusively for store lighting for the past twenty years or more.

A Novel Distant Control

We have an installation of gas lighting at a large amusement hall that is worthy of note. Two five-mantle outdoor No. 50 Humphrey Inverted Arcs are in use practically seven nights a week for hall lighting. The system of lighting for turning the arcs on and off is operated from the stage at the rear of the hall. The arcs are hung four ft. from the ceiling, which is 20 ft. high, and in order to properly operate the lamps to do away with the chain pull we equipped a "Distant Igniting or By-Pass System" on the stage. A separate line of ⅜-in. pipe is run to the attic with separate branches to each lamp for pilots. When they wish to turn the arcs on or off, the main supply is opened or closed by turning slowly a 1-in. lever handle gas cock. This system is as simple as turning an electric switch as the pilots are burning continuously, the only operation required being the opening or closing of the gas cock. The management of this hall is well pleased with our system of operating these lamps, as well as our gas service. The old way of chain pull rocker or ratchet system caused confliction when the hall was used for volley or basketball. The globes are guarded with a wire basket to eliminate breakage.

In conclusion I wish to repeat the assertion that the success of obtaining and holding commercial gas lighting is the quality of gas and proper maintenance of the units after installation. These two problems properly attended to insure you of a satisfied consumer, which is the only asset on the credit side of the ledger.

Stopping Wastes in the Boiler Plant

(*Continued from page 260.*)

condensers. The make-up water may come from a softener or may be cold water direct from pumps or water mains. Some heat may be conserved where cooling water from an air compressor is used for makeup. At any rate, assume that the average temperature of the water to the heater is 100 deg. Fahr. The boiler feed pumps will supply enough exhaust steam to raise this temperature about 50 degrees and sufficient exhaust should be added from some other source even if it requires a long run of pipe to raise the temperature the remaining 60 degrees more or less. Remember that a good feed water heater and hot water to the boiler is one of the cheapest ways of improving the plant economy. The feed water pump should be large enough so that it can supply all the requirements at a piston speed of not more than 50 ft. per minute, and preferably about 35 ft. per minute. It should also be placed far enough below the water line in the heater so that it will handle the hot water. Proper care of these points will mean satisfactory operation and a minimum repair cost. A good oil separator either in the exhaust steam line or built integral with the heater is very necessary to prevent oil from getting into the boilers.

Feed water regulators will improve the efficiency under certain conditions, but in many cases should be considered only after more important items have been provided. Water softeners come in the same class and their use is determined entirely by the character and hardness of the water supply. Mechanical soot blowers are becoming almost standard equipment on boilers, and with proper use will show a big return on the investment. Mechanical stokers are rapidly coming to be considered as a necessity. There is no doubt but that they will show a much higher efficiency than hand firing when properly designed to fit the plant. Not only is it a matter of thermal efficiency, but also they are necessary in order to burn the present low grade coal screenings and to run the boilers at a maximum and efficient capacity. By this it is not meant that the thermal efficiency increases as the boiler is forced to higher ratings, because this efficiency actually drops off above a certain point. There is a certain point in each plant, where it pays to run the boilers so that the slight loss in efficiency is more than offset by the saving in investment for additional boilers, building, etc.

Giving Him a Chance to Work With His Head

Labor is scarce and a fireman will not stay in a hand-fired plant if he can get a job in a stoker-fired plant. Anything which will reduce the number of men in a plant will save enough to pay for a considerable investment. Also, it is possible to keep a better man in a modern plant where he has a chance to work with his head part of the time, instead of entirely with his back.

In some cases mechanical stokers have been installed under conditions where there was no chance to show good results and for that reason some engineers who have had unfortunate experiences think that a stoker is not what it is cracked up to be and that they can get just as good or better results with hand-fired operation. When the stoker is suitable for the coal to be burned, of the proper size for the load to be carried and when the boiler is set high enough to provide sufficient combustion space, other things being equal, the stoker is bound to show a much better efficiency than the hand-fired grate.

There is one condition peculiar to a gas plant which should be taken into consideration in designing the boiler plant of a gas plant. This is the coke breeze which is usually of no value except to burn under the boilers to produce steam. On a hand-fired grate this is a slow burning fuel and therefore it is hard to get even rating out of a boiler. When mixed with coal it is possible to raise the boiler capacity, but in either case, the efficiency on a Coxe Traveling Grate stoker. Results in a number of plants have shown that with this stoker it is possible to double the output of the boiler and that the comparative evaporation rate with straight coke breeze fuel is about 5.5 lbs. water per lb. of coke as fired for hand-fired operation, and 6.7 lbs. water per lb. of coke as fired when burned on the Coxe stoker, or an improvement of 22 per cent in efficiency.

This evaporation of 6.7 is based on coke breeze of 10,000 B.t.u. per lb. as fired and an average daily efficiency of 65 per cent.

The initial investment of a modern plant with stokers, coal handling machinery, etc., will probably be about 60 per cent higher per rated horsepower installed than

for the plain boiler plant designed for hand-firing and without coal handling or any special labor-saving apparatus. However, the latter plant will require additional rated horsepower in boilers, so that the total cost for the completed plant to deliver a given quantity of steam will be about the same in either case. Also, on account of the fewer number of boilers, the maintenance and repair bills for the modern plant will not be any higher than those of the hand-fired plant.

The conclusion is that a modern plant will not cost any more for fixed charges and that the saving in fuel and labor is all clear gain. This saving will vary in different plants, depending on the local conditions, and each case should be studied and worked out as an individual problem. The odds are heavily in favor of the modern plant and in many cases it has been found advisable and economical to rebuild the entire boiler plant.

Industrial Prospects that the Small Company May Sell

J. H. Gumz Points Out Wherein Too Much Stress on the Profit to Be Gotten on the Appliance Too Frequently Blinds the Gas Man to the Continuing Profit that May Be Had on the Gas

During the recent war, and I believe it is also true of the period since, gas companies as a whole did little or no construction work either in the distribution end or in the plant. As a direct result of this many have found that though the plant has not been enlarged their ordinary domestic load had increased to a point where they are up to capacity at times during the day. By this I mean that the great volume of gas is consumed during a short period of time, giving a large load factor for that time, but when spread over the entire day a comparatively small one. And now costs of operation and construction have risen to such a point, without a proportionate increase in rates, that it would almost be foolish to build merely to take care of a large output over a short period of time, said J. H. Gumz in an Illinois Gas Association convention paper.

This leaves the gas companies, particularly the ones operating in a town of from 10,000 to 80,000, in a position making it necessary to increase the sales without materially increasing the plant capacity. Or, as our electric friends say, "Fill in the valleys in your load curve." Don't depend on the business you get during a few hours each day, but spread it out so you are getting the most possible every hour. The larger companies have for some time been following this policy, but the smaller ones haven't as yet fully realized just what can be done, and there is no reason why they cannot take on similar business to that of the larger ones.

It is not the object of this brief paper to go into detail on how to do this, but rather to suggest a few points which can be developed in discussion, or which will lead the manager of a small property to consider every possible source of revenue in his territory. It is really surprising how many possibilities there are for him to add to his load which often he has not taken the trouble to follow up because he has thought that an especially trained man was necessary to sign up his business.

Small Cost Appliance Big User of Gas

Look at it this way—when you sell a stove you make a certain profit on your sale which is larger, without a doubt, than the profit on, say, a candy furnace. But here is the thing that many gas men seem to forget when selling appliances, namely, that they are primarily dependent on the sale of the gas used by the appliance and not the profit derived from the sale of the appliance itself. The confectioner will average a monthly bill of $10 to $15 on $1 gas, as against $3 or $4 from the stove. But in spite of this, the gas man goes ahead and sells stoves, increasing his peak load all the time, and lets his good off peak business go merely because he doesn't make a large profit on this appliance. Don't mistake me, though, and think I advocate stopping all effort to sell stoves, because I do not—the continued sale of stoves is essential—but if one-tenth of the time and effort that is expended on these sales was put on lining up so-called industrial business the results would be astonishing. Part of this neglect is due to the fact that salesmen are usually paid a commission on sales, so they don't bother about selling a few burners which net them little but the company much. Pardon my giving an illustration from my personal experience. I sold six burners which had a maximum capacity of 3,000 cu. ft. per hour and an average running capacity of about 2,000 cu. ft. per hour. The total cost of these burners was less than $100, which would, perhaps, compare with the price of a good stove to-day, but think of the difference in revenue derived from the two. The gas stove uses 2,000 cu. ft. a month, while the $100 worth of burners use 400,000 cu. ft., or 200 times as much. So I think it would pay the company to have a salesman devote a certain portion of his time entirely to this class of business, pay him a larger salary, if necessary, to make up for his decrease in commission, but be assured, your increase in output will offset his increase many times.

Possibilities in the Small Territory

Just a word or two about some of those possibilities which can almost be had for the taking. Every town has a number of butcher shops, several of which will smoke their own meat. Why not a gas-fired smoke house? Garages and tire repair shops should use gas for their vulcanizing. Some heat the water for washing cars. Speaking of washing, I believe the State law requires factories to provide hot water for their employees to wash with. Look up the factories in your town and see if they are providing hot water in the lavatories. Along this same line come cleaning and pressing shops that use a small steam boiler, and the factory that does plating requires a pickling bath to be kept hot with steam. While on the subject of hot water and steam, how about selling the drug store a still—not one for moonshine—but to distill water? Your local newspaper should use gas for heating type metal. Right now bakeries should be one of the easiest prospects to sign up of any. Look at the number of gas-fired reel ovens put into operation in the last year. This covers some of the smaller prospective users of gas that any company can take care of without seriously overloading itself.

Getting in the field of relatively large consumption as compared to a bakery or garage, one finds that shops doing japanning are almost forced to use gas. And any hot air drying process comes in this same class. The railroad shops and educational institutions should use gas.

Brass melting can be done just as economically with

gas as with oil or coke, and core baking in the foundry should be the gas company's business at almost any price—not forgetting drying the ladles and using a gas torch to start the cupola. Shops doing steel treating and forging can be taken on with less effort than ever before, due to the increasing price of oil, and if it goes much higher you may have them come begging you to hook them up. Galvanizing and tinning business can be secured with a little work, and if there is an asphalt roofing plant in your territory, it sure pays to line it up, as the load is constant for nearly twenty-four hours a day and every day in the week.

These are just a few suggestions, and I haven't gone into detail because one could write endlessly on how to go after different prospects, but I believe that if just a little time and thought is put on it every gas company will have but little trouble in filling in the valleys that our electric friends talk about, and which occur to a greater extent in the gas business.

Quantity Consumption and Its Effect on Customer's Rate

S. B. Cushing Explains Why Wholesale Rates Should Be Allowed Wholesale Users

It might be stated that a customer who uses 1,000 cu. ft. per hour or more is a large consumer of gas, but you will readily see that any rate schedule cannot take into consideration all of the gradations that might truly exist, explained S. B. Cushing, in a paper before the Illinois Gas Association. In fact, electric rates and gas rates are more profuse in gradations than are found in rates for other commodities. You will observe that with passenger transportation companies there is little gradation in large cities, as, for instance, no differential is made between the passenger weighing 150 pounds and another passenger weighing 300 pounds, and no differential is made whether he rides one block or fifteen miles, and no differential is made in the postage rate whether a letter travels a mile or two thousand miles, and the Government simplified its zones for its parcel post system, finding that its first gradations were too complicated and not warranted; therefore it is paramount that in the study of rates, we must keep ever in mind that for the sake of simplicity there must be a compromise of diversity of conditions and expenses. However, this compromise should not be carried to extremes or it will throttle the development of a certain class of business to the advantage of another class of business. It does not take a great deal more than common sense to determine the happy medium.

The question may be asked, "Why should a customer who uses a large quantity of gas get a lower rate than one who uses an average amount?" In answer to this question, data in regard to consumption, expense, etc., will show wherein the large customer earns a considerable discount, and certainly, if he earns it, he should receive it. The courts and commissions usually refer to and make comparisons with other lines of business to sustain their decisions, but the utility company itself does not dare to rest its case upon such a basis, because it might result in saying that two wrongs make a right.

It can be shown very clearly, and the thought is commonly accepted, that a man who buys a barrel of sugar most naturally should receive a much lower rate than the one who buys five pounds at a time, and, similarly, a man who buys a carload of coats should receive a much lower price than the one who goes into his local store and buys two coats a year. It is this differential that sustains the retailers, but the large customer does not purchase gas to retail it; therefore, the discounts must be considered from their true angle.

The electric utility has gradually and surely been crowding out the gas utility from the lighting field, and it has become necessary for the gas companies to search out other classes of customers to maintain and develop their properties, and most naturally it became evident that the big factories, using immense quantities of heat for various purposes, should be using gas for their processes. No factory should be paying the same rate per 1,000 cu. ft. that had been paid by residences which average between 2,000 and 3,000 cu. ft. a month. It became necessary to study into the question to see what discount the large customer was entitled to and then see whether the low rate gas would be attractive to him.

What Is the Worse Kind of Rates?

The poorest rate is a flat rate, the next better a straight line meter rate, the next better a step rate, and the next better, a block rate, and perhaps the most nearly scientific is the demand and output rate. However, there is much in favor of the block rate when applied to the customers of medium size, as the block rate avoids the use of demand meters, which always represent a certain amount of investment, expense and trouble.

The Public Service Company of Northern Illinois has called upon the American Meter Company to rise to the needs of the times and furnish it with large meters. A meter at the Fulton Saw Works is the largest diaphragm size that can be made. This meter is working under heavy duty and is not reinforced for high pressure. It operates on about one pound pressure. The meter is equipped with a by-pass, which is sealed and can be opened so as to insure gas service in case of meter trouble. The small box, which is discernible on top of the meter contains the demand recording device. The constant of this particular meter is 915, so that for every small horizontal mark 915 cu. ft. have passed through the meter. It is very easy to obtain by inspection the heavy load periods of the day and from them pick out the largest hourly consumption. This demand device can also be used as a check against the consumption meter in case such a check is desired.

The following is a list of six apartment buildings in the city of Chicago, being supplied by the Peoples Gas Light & Coke Company through master meters. The landlords include the cost of the gas with the rest, as a total or by adding a fixed amount per month to the rent. This saves an enormous investment to the gas service company and affords convenience to the tenants. The first apartment listed has an unusually large monthly consumption, as compared with the other apartments listed because, it is by far the largest apartment building, and also has a large restaurant in connection therewith.

Five apartment buildings have been listed where a separate meter is installed for each apartment.

Attention is called to the fact that, as a rule, the larger the apartment building, the smaller the consumption per apartment. This is due to the fact that the apartments are small and are generally sought out by corre-

(*Continued on page 267.*)

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As the Journal Views It

Helping Out in the Pinch

The lumber industry may well look with envy upon the automobile manufacturer's ability to sell every unit he can turn out at what may seem prohibitive prices. Lumber goes merely to make such prosaic and essential things as houses. When it gets high people say the price is prohibitive, and stop building. But the automobile quite largely goes to meet the luxury craving, and when a people are out on a spending jag mere prohibitive prices are not going to deter them; they merely intensify the craving. But the gas industry envies the prosperity of no industry. It rejoices in it, for good times and bad times in any industry that employs human beings, power and fuel are reflected back to the gas industry. Its ideal opportunity for prosperity is in times when things are humming in all industries. Its most distressing times are when there is depression in a considerable number of industries. Hence it is vitally concerned in keeping working at full blast the enlarged manufacturing facilities that are a heritage to this country from the war.

Just now there is a greater demand for manufactured products within our own borders than the manufacturing plants are apparently able to supply. People have done without things to such an extent that now that the leash is off they want more than they ever wanted before. And these things have had to come straight from the mills without pause. The retailer's reserve shelves were cleaned out bare during the famine.

But soon the demand will be caught up with and the reserve stocks renewed. What then? This

country itself cannot consume what its present facilities can produce.

Unless a market for the surplus can be found beyond our own borders, a very considerable proportion of our productive capacity will stand idle and a large number of people accustomed to prosperity will taste bitter, desperation engendering poverty.

This was foreseen in the midst of the building up of the war-time productive capacity. It was recognized that to keep young we must go beyond our own borders with our goods. And there was confidence that, despite higher labor costs per worker and the determination even on the part of the employer that the worker's wage scale should be kept up, we could sell in competition with other manufacturing nations.

The time is approaching when our confidence must be put to the test. Yet another inequality has entered into the lists against us; that is, exchange rates, which enable, for example, a British manufacturer to fabricate his goods at high costs and sell them at high profits to us, yet cheaper than ours can be produced, for he pays his workers in pounds and fractions thereof, while we pay ours in dollars, and the pound that normally buys close to five dollars now buys little more than three.

We believe we could compete against Europe's cheaper labor with our greater proportion of machines and fuel economies, with the same weapon, using it even more intensively, we must compete in addition against their cheaper—as compared to ours—money unit.

The gas man with the applications of his fuel to industrial tasks can accomplish much in reducing the cost of production in this country without reducing the compensation of the human worker. In proportion to his work as a citizen, a patriotic American, he will enhance his ability to render such service by study and research.

As Pertains to Oil

Had any man been so bold a few years ago as to predict that gas oil would sell as high as thirteen cents a gallon, there would have been few who would have accorded him even the courtesy of a second thought. And those few would have pronounced it the end of oil for gas making. How this total elimination would be brought about they would have probably declined to hazard a guess, but in their viewpoint it would be accomplished; its continued use would be impossible. These men could have conceived of no obtainable gas rate high enough to make it possible to retain oil, except in minor quantities in the gas making process.

Yet to-day gas works are paying as high as thirteen cents a gallon for their oil. They are faced with the possibility of having to pay even higher. Yet oil is still used in vast quantities and there is little to indicate steps towards its practical elimination from the process.

If the prospect that looms up ahead is to be of long duration, then we may be certain that the condition will work out its own cure.

Just as gasoline is getting to be too expensive a fuel for the motor vehicle, gas oil is getting to be too expensive for gas making.

The human mind doesn't really get into intensive activity until it finds itself practically confronted by a stone wall.

We are quite certain that when the extensive and rapidly expanding automobile industry finds its sales of cars and trucks considerably cut down due to the high cost of the fuel to run them, it will get down to an industrious skirmishing about for a cure for the difficulty. And that cure will speedily be found, either in a pressure upon coal carbonizers for benzol, development of alcohol production among agriculturists, or hastening developments in the oil shale resources, which, seemingly, only lack of big capital is holding back.

And so it will be in the gas industry. If gas oil becomes so expensive as to be prohibitive, a means will be found to get along without it.

Summer Business

Every time one suggests an extensive house-heating business there arises the question as to counterbalancing summer business.

An essentially summer load that little has been said in regard to is suggested in a newspaper advertisement of the Consolidated Gas Company of New York. "What we do for the Hotel Royalton we are ready to do for other large hotels, factories, loft or office buildings," the company offers.

For the Hotel Royalton, during the summer months, it heats 5,737 gallons of water to a temperature between 160 and 170 degrees Fahrenheit with a gas-fired steam boiler, and, incidentally, secures a daily gas consumption of little short of 9,000 cubic feet.

This is essentially and safely summer business. Many years indeed will pass, from present indications, before such places are likely to be inclined to forego coal-fired equipment for space heating and the major volume of water heating in the cold months. It would seem that in bulk such summer business could be extended practically without limit.

Of course, those who object to house-heating business in winter because of its unbalancing of the seasonal load really speak with their fingers crossed. They do not take themselves seriously, and cherish but slight hope that others give their argument any more weight.

A little searching about, but slight investigation, will reveal more than ample summer business to balance the greatest house-heating load we could build up in a decade, no matter how energetically we went out after it.

Being Dissatisfied to Succeed

A notable success once laid down that only the man continually discontented with his lot in life could hope to succeed.

There was a novelty to this phrase, when uttered, that made it catch. To-day there are so many dissatisfied people about us that we begin to question whether success, after all, is worth such a price.

After all, the object of life is to live, the aim of civilization and industry to make living easier and more pleasant. We work because Nature unaided cannot produce the things the world as it is populated to-day needs to exist on.

Mankind in this country is getting away from the standard of measuring success by dollars and tending to measure it more by man's work for and his conduct toward man.

When work is practically the life of the worker it is drudgery. When it becomes merely an incidental part of life it is the break in between pleasures that make us value those pleasures and enjoy them the more.

The man who has something to work for is the man who works to the best advantage.

If he has a home and grounds he would beautify, and his works brings him the funds to do so, he has an interest in his work.

A great step toward the elimination of the hanging back tendency, the production curtailment viewpoint, is to give him something that will enable him to readily visualize what he is getting from his work.

Add to this the development of other interests in his mind so that in the off period there will be a complete break in his thoughts from the day's work that will bring him back to his bench the next day with a sense of coming to a fresh and new interest, and we come near to having a real workman.

Quantity Consumption and Its Effects on Customer's Rate

(*Continued from page* 264.)

spondingly small families. The general effect, of course, of the enormous apartment buildings is against civic developments, in every sense of the word.

MASTER METERS

Number of apartments in building.	Number of residents.	Average gas consumption per apartment per month. Cu. Ft.	Total monthly consumption. Cu. Ft.
175	394	*1,502	259,500
78	175	922	71,900
48	96	613	29,400
68	136	918	47,550
75	150	1,278	95,866
40	70	1,046	41,650
Individual meters			
31		1,114	34,600
31		1,061	32,800
37		1,137	41,000
38		1,232	46,800
31		892	27,600

The average rate through the master meter is very close to 80 cents per 1,000 cu. ft.

*Not all apartments were occupied the entire period.

There is some agitation in the gas circles in regard to the question of heating residences and buildings in general with gas. If this could be developed, it would increase the return on the company's investment to a remarkable extent. The Public Service Company of Northern Illinois has done a little experimenting along this line and in one case of a nine-room house in Blue Island, Ill., when the outside temperature was an average of 52 degrees, it required 25 cu. ft. an hour for heating purposes. This was a consumption of 600 cu. ft. a day for an increase of 20 degrees. It also required 97 cu. ft. an hour when the average outside temperature was 32 degrees. This would be 69,840 cu. ft. a month and at 65 cents a 1,000 for 600 B.t.u. gas, this would cost $45.40 a month for heating purposes. While the above figures are staggering, yet they are not necessarily discouraging, because this could undoubtedly be considerably reduced by more efficient methods of using the gas by using a lower quality of gas, and a big saving per 1,000 cu. ft. could be made if houses were generally heated by gas. Also, it is worth considerable a month, especially during the coldest month, to shovel coal and to remove ashes. As the price of coal increases its advantage over gas decreases.

As a parting word, I would caution the companies that take up the question of new rate schedules for large customers to get their rate schedules too high at first, rather than too low, so as to feel out the situation and protect their own interests as well as those of the customers, for it is very embarrassing, indeed, to have an industrial customer install gas service on the basis of very low rates and then find that the rates must be increased. This word of caution, however, should not influence any member company to delay taking up the study of its rate schedules at the earliest date possible.

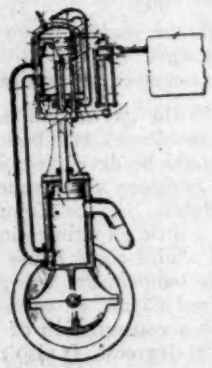
This Year's Bituminous Coal Output to Date Well Ahead of 1919

Though below the output for the corresponding period in 1918, this year's bituminous coal output to date is 18,117,000 tons ahead of that of 1919 for the first fifty-six working days of the year, according to the U. S. Geological Survey.

PATENTS PERTINENT TO GAS INDUSTRY

Internal Combustion Engine

Patent No. 1,328,685; described in Patent Office *Gazette*, Jan. 20, 1920, page 436. Elias H. Palmer, Ladson, S. C. Filed April 28, 1917. Serial No. 165,302. 1 Claim. (Cl. 60—15.)



This internal combustion engine is the combination of a power cylinder and a compressing cylinder arranged end to end in spaced relation to each other, and each having heads at both ends. A frame rigidly connects the cylinders. Reciprocatory pistons work in the cylinders. There is a connecting rod which is common to both pistons and which has a fixed connection therewith. A by-pass connects the cylinders. There is a means for preventing return flow through the by-pass while permitting a free flow from the power cylinder to the compressing cylinder. The last-named cylinder has an exhaust port, and a charging cylinder in communication with the power cylinder. There is a cross-head which has a fixed connection with and is carried by the piston rod. There is a piston rod for the charging piston, having a normally fixed but adjustable connection with the cross-head. There is also a means for adjusting the last-named piston rod relative to the cross-head for varying the limits of movement of the charging piston relatively to the limits of movement of the power piston.

Combined Gasket and Oil-Gasifier

Patent No. 1,329,343; described in Patent Office *Gazette*, Jan. 27, 1920, page 588. Ernest Raba, Valley, Olka. Filed July 11, 1919. Serial No. 310,198. 3 Claims. (Cl. 123—33.)

This is an explosion engine with a cylinder body and a removable head adapted to form a combustion chamber. The cylinder body has an intake port formed therein, opening into the combustion chamber. There is a means for supplying oil and air to the intake port. A gasifying device, comprising a plate of metal is so arranged to serve as a gasket between the cylinder body and the removable head. That portion of the removable head which is over the intake port, is dished and perforated to permit the oil and air to pass through it into the combustion chamber.

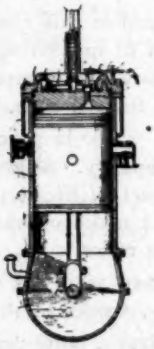
Device for Igniting Gas Jets

Patent No. 1,327,813; described in Patent Office *Gazette*, Jan. 13, 1920. Martin Fischer, Zurich, Switzerland. Filed July 26, 1919. Serial No. 313,608. 4 Claims. (Cl. 67—6.1.)

This device for igniting a jet of gas is a combination of a handle, a shaft rotatably mounted on the handle, a serrated disk loosely mounted on the shaft, and a piece of pyrophorous metal. A spring presses the pyrophorous metal against the disk; a spring loosely surrounds the rotatable shaft and one end is attached to the disk. There is a second spring, one end of which is fixed to the rotatable shaft and the other end on the handle. An arm, fixed to the rotatable shaft, runs across the handle.

Internal Combustion Engine

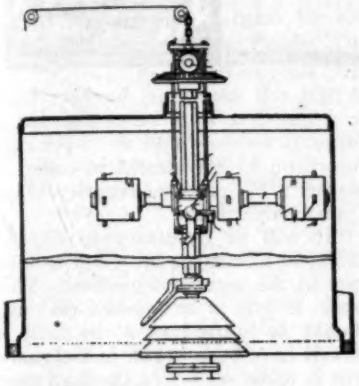
Patent No. 1,328,141; described in Patent Office *Gazette*, Jan. 13, 1920, page 298. Robert L. Folks, Waycross, Ga. Filed Jan. 3, 1917. Serial No. 140,409. 2 Claims. (Cl. 123—65.)



This is a two-cycle internal-combustion engine with a cylinder and a main crank shaft. There is a main piston, which is coupled by a connecting rod to the crank shaft and adapted to overrun the inlet and exhaust ports of the cylinder. The cylinder has a spider-like head with constantly open orifices. An auxiliary piston in the cylinder has a rigidly attached piston rod that is guided by the cylinder head. A rotary cam co-operates with the piston rod to move the auxiliary piston toward the main piston. There is a means for moving the auxiliary piston away from the main piston with a relatively quick action. There is also a driving means between the crank shaft and rotary cam, and an ignition element is carried by the auxiliary piston and is adapted to pass through the spider-like cylinder head. An ignition member is pivotally supported by the cylinder head and adapted to contact with the first-named ignition element.

Gas Producer

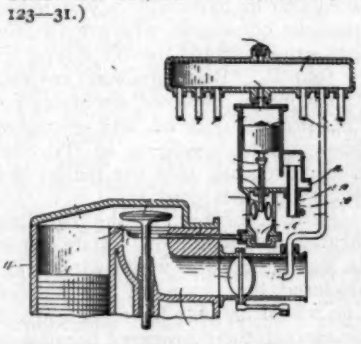
Patent No. 1,327,861; described in Patent Office *Gazette*, Jan. 13, 1920, page 245. William Climie, Ayr, Scotland. Filed Feb. 25, 1919. Serial No. 279,163. 5 Claims. (Cl. 48—85.2.)



This is a gas producer with a casing and a fuel rake arranged therein. There is a device for imparting a traveling movement to the rake over the surface of the fuel. Toothed crushing rolls are carried by the rake structure, and the rolls tend to maintain the rake at the top surface of the fuel and to crush the crust of it.

Fuel-Supply Mechanism for Internal Combustion Engines

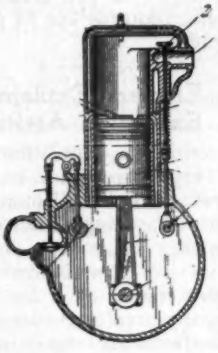
Patent No. 1,328,142; described in Patent Office *Gazette*, Jan. 13, 1920, page 298. Stephen Ivan Fekete, Detroit, Mich., assignor, by mesne assignments, to Essex Motors, Detroit, Mich., a corporation of Michigan. Filed July 11, 1917. Serial No. 180,022. 10 Claims. (Cl. 123—31.)



This fuel supply mechanism for an internal combustion engine has a fuel pit and a means for supplying fuel to the fuel pit in a continuous flow while the engine is running. Also there is means for injecting into the engine the fuel which has accumulated in the fuel pit between successive strokes of the engine. It has a regulating means which is responsive to variations in pressure in the air intake of the engine, in order to vary the flow of fuel to the fuel pit.

Internal Combustion Engine

Patent No. 1,328,265; described in Patent Office *Gazette*, Jan. 20, 1920, page 357. Hubert Caunt, East Calgary, Alberta, Canada. Filed Feb. 24, 1919. Serial No. 278,886. 2 Claims. (Cl. 123—76.)



This is an internal combustion engine with a plurality of cylinders. Each of the cylinders is provided with a plurality of scavenging ducts, which communicate the crank case of the engine with the cylinders. There is a manifold arranged upon the crank case, which is adapted to communicate with the crank case. A plurality of intermittently actuated valves are adapted to sever communication between the crank case and manifold. These valves correspond in number to the number of the cylinders of the engine. There is a means for retaining the valves that are open during the intake and compression strokes of the pistons. This permits the entrance of air from the manifold to the crank case. This means is adapted to close the valves at the beginning of the working stroke, whereby the air drawn into the crank case is compressed and injected into the cylinders of the engine through the scavenging ports at the completion of the working stroke of the piston.

10,000,000-Ft. Gasser Brought In in Oklahoma

Evidence that the Oklahoma gas field is steadily extending southward toward Dallas, Texas, is said to be found in the bringing in of a 10,000,000 cu. ft. capacity gasser in 31-8-8, one mile south of Wewoka, Okla. This is the point farthest south at which gas has been found in paying quantities in the Oklahoma field, according to V. R. Biggers, general attorney for the Murray Company, who received the information.

P. S. Commission Preparing Heat Unit Gas Test Bill

The legal department of the Public Service Commission of New York City is drafting a bill to be submitted at the present session of the Legislature giving the Commission power to change the standard of gas from candle-power basis to that of the British thermal unit.

Because of the law demanding the 22 candle-power standard for gas in New York City, the Public Service Commission cannot, without legislation, change the measurement to heat units. One of the witnesses at the hearing into the scarcity of gas oil last week described the manufacture of 22 candle-power gas as wasteful, involving the use of millions of gallons of oil that might as well be poured into the East River for all the good the gas consumers of Greater New York got out of it.

Not only can the heat unit gas, it is said, be manufactured practically without the use of gas oil, but it gives more heat and more light per unit than the statutory quality of gas. For lighting purposes, however, the use of heat unit gas requires incandescent lamps. Open gas burners would have to be eliminated altogether.

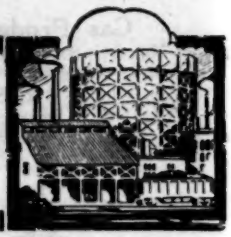
When one of the gas experts was asked what 22 candle-power meant translated into heat units, he said: "If the gas maker regularly meets the 22 candle-power requirement he can be expected to supply from 630 to 675 heat units per cu. ft. on the average throughout the year."

Chicago Company to Continue Its 85-Cent Rate

The Peoples Gas Light & Coke Company, Chicago, Ill., has been granted permission by the public utilities commission to continue its present rate of 85 cents a 1,000 cu. ft. for gas until Dec. 31, 1920. The rate originally was granted Aug. 1, 1919, to offset higher costs and would expire on March 31. Its status continues temporary.

The petition requesting permission to continue the 85-cent rate was filed before the labor troubles arose and the company is now awaiting the labor outcome before filing a petition for higher rates.

NEWS OF THE GAS INDUSTRY



Demand for Benzol Still Far in Advance of Supply

Prices in All By-Products Have Advanced in Past Week

The market for practically the entire list of coal-tar products has shown the same old tendency to advance during the past week. Supplies are in bad shape and the producers and dealers were behind on orders and were anxiously seeking supplies in the open market to take care of their customers. There is very little goods to be had in any direction and the tone of the market is still one of extreme tightness. Scarcity of the crudes is an important factor in the firmness of the market.

The demand for benzol is still heavy and the producers have not as yet caught up fully on their contracts. They can offer only very small lots for immediate shipments and are restricting these shipments to actual consumers of the material. Spot lots of the 90 per cent changed hands during the week at 30 to 35 cents per gallon. The makers are still quoting futures at 25 cents for this grade and 27 cents per gallon for the pure.

There has been no change in the price of creosote oil. Quotations still stand at 40 cents per gallon for the 25 per cent and 20 cents per gallon for the 15 per cent.

There has been about the usual demand for solvent naphtha during the past week, and the producers state that their withdrawals on contract are about all they can take care of at present. Spot goods have been advanced on the tightness of the market and are now quoted at from 2 to 5 cents above the producers' price of 23 cents per gallon for tank cars.

Cresylic acid in all grades has been in demand during the past week, and the makers report that they are about sold up and that there is little spot goods left for the consumers. Some second-hand trading was reported during the period at higher than the producers' prices, which remained on the basis of 90 cents per gallon for the 97 to 99 per cent and 85 cents per gallon for the 95 per cent dark grade.

Ralph Elsman Explains His No Extension Attitude

The continuous operation of his plant is very dangerous to its present consumers, Ralph Elsman, vice-president of the Kings County Lighting Company, Brooklyn, told the Public Service Commission recently during the course of a hearing by the company into the adequacy of his manufacturing facilities. He added that any extended demand for gas might mean that his plant would have to cease its supply, and before it could be resumed 40,000 homes would have to be visited to be sure that all outlets were turned off in order to prevent the possible asphyxiation of anybody.

Mr. Elsman told the commission that the oil contract of his company, which expires April 14 next, has been renewed at a price of 10 cents per gallon, which means a cost of approximately 40 cents per 1,000 cu. ft. of gas. This is one-half of the amount allowed for gas under the 80-cent statutory rate, he pointed out.

In a statement made under oath to the commission, Mr. Elsman said:

"It is the desire of this company to supply all consumers who may apply to it, but it is a physical impossibility for us to do this at the present time and under the present conditions.

"My first duty is to the public, and I must protect the people's interests in every way possible. I have not the funds with which to make the needed extensions and improvements to my plant nor can I borrow any. It is possible for me to add many consumers during the summer time, but next winter the situation will again become acute and dangerous.

"I cannot borrow any funds nor can I raise any money through the sale of our securities; in fact, I am hog tied. I can go no further.

"To sell securities, bankers have told me that it is necessary for a property to show a 10 or 12 per cent return on its investment in order to market a 7½ per cent security. This I am unable to do.

"It will be necessary to expend $800,000 to enlarge my plant to take care of the increased business. This work, if it is to be finished on time, should be started now; in fact, it should have been begun in February if it is to be ready for the load next winter."

Mr. Elsman stated that it would be necessary to expend over $1,700,000 to $2,000,000 on improvements during the course of the next eighteen months. One of the great necessities, he declared, is a 6,000,000-cu. ft. holder, but this cannot be installed in time to help take care of the demand next winter.

Mr. Elsman described days during the present winter when the consumption of gas was so great that the mains carrying the gas to the homes were connected almost directly with the machines which were making the gas. He made it plain to the commission that he has not wilfully refused to take on additional consumers.

Mr. Elsman, also under oath, denied that he had made any statement that the consumers who are awaiting gas supply should use oil stoves.

John P. O'Brien, assistant corporation counsel, objected strenuously to the presentation of any testimony showing the condition of the company, declaring that the matter was before another court.

John J. Muller, of the Dowling-Muller Company, real estate agents in Bay Ridge, also was a witness and declared that many of the builders for whom he sells have been unable to market their property because of the fact that they could not have any assurance as to when gas could be installed. He told the commission that he believed a compromise, allowing temporary relief to the gas company should be effected so that the extensive building program would not be interrupted.

Wisconsin Gas Association Holds Nineteenth Annual Convention at Milwaukee

Gas Companies Urged to Educate the Public to the Value of the Work Done by Public Utility Corporations—Will Result in Realization that Higher Rates Are Synonymous with Better Service

The nineteenth annual convention of the Wisconsin Gas Association and the twelfth annual convention of the Wisconsin Electrical Association were held in the Hotel Pfister, Milwaukee, March 23, 24 and 25.

The following officers of the Wisconsin Gas Association were elected: Bruno Rahn, Milwaukee, president; A. F. Davey, Sheboygan, vice-president, and Henry Harman, Milwaukee, secretary-treasurer.

Many interesting papers were presented, as follows:

"Timely Suggestions for Stopping Wastes in the Boiler Plant," by Loren L. Hebberd, M.E., field engineer, Combustion Engineering Corporation.

"Obtaining and Holding Commercial Gas Lighting," by Charles A. Pepper, Sheboygan, Wis.

"On the Removal of Hydrogen Sulphide from Gas," by Profs. O. L. Kowalke and E. C. Brenner, University of Wisconsin.

"The Factory Owner's Version of the Value of Gas as an Industrial Fuel," with lantern slide illustrations of recent installations, by A. A. Schuetz, industrial engineer, Milwaukee, Wis.

Informal discussion: "What are you doing to obtain 100 per cent value for every dollar expended on plant operation and construction?"

Heads of public utility corporations, especially those representing gas companies, were urged to take every opportunity to lead in civic movements as a means to bring about a better understanding between the companies and the public by speakers in the first day's session of the association.

A better understanding between the people and public utilities would bring about the knowledge that the gas business is a legitimate one and ultimately would result in fostering recognition of its rights, R. B. Brown, general manager of the Milwaukee Gas Light Company, told the convention.

A statement by Charles A. Pepper, Sheboygan, general manager of the Sheboygan Gas Light Company, that gas is becoming obsolete in many cities "because these cities are looking for other means of illumination," was challenged by delegates.

They declared that the principal reason for the decreased use in gas was caused by the failure of public utility corporations to get after new business.

"The gas industry is represented by the men that are in it," said R. O. Jasperson, of the Milwaukee Gas Light Comany, "and if they don't say a good word for it—if they lack enthusiasm to get after new business—if they concede that its use for illumination is passing—who is going to boost gas?"

Despite much research work, the problem of finding an improvement over the present process of removing sulphur compounds from gas still is unsolved, said Prof. E. C. Brenner, University of Wisconsin.

"Many plants are finding their principal trouble not with hydrogen sulphide but with fixed sulphur compounds, which exist in such quantities as to render the gas unfit for use," said R. B. Brown. "This especially is true with the coals and oils now in use in producing gas."

The recommended advance of 27 per cent in the wages of miners was flayed at the second day's session of the association.

Over 27,000,000 tons of coal are used yearly by public utility corporations, including gas producing companies, and about 60 per cent of the cost of producing gas is in the consumption of coal, delegates said.

The advance will fall on the coal buyers of the country, and ultimately will result in a general advance in gas throughout the country.

These facts were impressed on the convention, meeting jointly with the Wisconsin Electrical Association, by M. H. Aylesworth, New York, executive manager of the National Electric Light Association.

"The advance in the cost of operating public utilities, gas and electric, will amount to about 15 per cent within a year," said Mr. Aylesworth.

He reviewed the growth of national public utilities for the last twenty years, and declared that from the point of efficient service they were still in their infancy.

"Plans are being made to educate the public to the value of work being done by public utility corporations all over the country," declared Mr. Aylesworth. "This, because we believe that the lack of co-operation between the utilities and the public is due to the public's ignorance."

"The Wisconsin Rate Commission's manner of handling public utility questions is being used as a model for the majority of public utility commissions throughout the country," said D. J. Mullaney, director of publicity of the Illinois Public Utility Commission, speaking on matters of mutual interest to the joint convention.

"There is a higher rate of efficiency in the Wisconsin commission than in any other utility commission in the country. In the majority of States where such commissions operate, as in Wisconsin, however, there is a pressure on the commissions from the public that should be alleviated by the candid self-publicity of the public utility companies of the States. Both the commission and the public utilities will function better for the relief of such pressure.

"The bounding costs of production and the fixed rates are playing havoc with many concerns. This is realized by the commission whose activities in alleviating such conditions are not understood by the public. As soon as the ignorance of the public on the true state of affairs is wiped away, their suspicion and their opposition will vanish."

A banquet for delegates to both conventions was held Wednesday night in the Milwaukee Athletic Club. Edward J. Dempsey, Oshkosh, acted as toastmaster.

"The interest shown in this year's convention and the discussion on technical points shows that gas company officials are beginning to realize they must be

versed in every angle of the business," said Henry Harman, re-elected secretary.

"While this is essentially the era of the specialist, this specialist must also be versed in other lines of his profession.

"Especially interested were delegates in how to improve relations with the public and to bring it to a realization that higher rates at this time are synonymous with better service.

"The time has passed when the gas companies can exist without the public, even as the public cannot exist without the public utilities."

San Diego Company Will Meet City's Demand

The San Diego Consolidated Gas & Electric Company, San Diego, Cal., has agreed to apply for a franchise for use of the city streets and to pay the city a 2 per cent gross revenue tax, which will come to approximately $25,000 a year.

The company's agreement to obtain a franchise and pay the tax was reached at a conference between gas company officials and the city council.

The city attorney will now proceed with the preparation of a franchise to be submitted to the gas company officials. It is to cover a period of fifty years. If it is satisfactory to them in other ways, they will then file application for the franchise with the council.

A court fight over the city's decision to compel the company to take out a franchise and pay a franchise tax, such as other public utilities are already paying, had been expected. The consent of the gas company officials to meet the city's demands caused general rejoicing.

The company, under the law, is exempt from franchise and taxation as regards illumination, but must pay on electrical power and gas used for heating and cooking.

Under ordinary conditions, the company would pay its tax annually, making the first payment one year from the date of franchise, but it has been practically agreed that payments will be made monthly so that the city, which needs revenue, may obtain some of the funds this year.

H. H. Jones, manager of the gas company, and Frederick W. Sterns, attorney for the company, attended the council conference.

Cheap Gas Tubing Dangerous, A. G. A. Warns Consumers

The American Gas Association has issued a warning to gas consumers against the use of cheap, unfit tubing in connection with gas appliances. According to the association, such tubing constitutes a definite menace to human life and is responsible for many of those accidents attending the use of gas-heating devices which are reported every year with the recurrence of cold weather.

Cheap tubing is a false and dangerous economy. By its use the consumer deliberately forfeits the protection of all those safeguards in the use of gas which have taken years of study and experiment to perfect. Gas companies cannot control the sale of this tubing, but they can and do warn the public most emphatically of the danger attending its use.

New Schedule of Rates for Akron, Ohio

The new gas ordinance approved for the Eastern Ohio Gas Company by the public utilities commission in the Akron district has become effective. All cards going out for the month of March will carry the new rate. This ordinance is effective until Nov. 26, 1929.

A schedule of rates follows: First 5,000, 48 cents per 1,000 cu. ft; second 5,000, 53 cents; third 5,000, 58 cents, and all over 15,000 will be charged at the rate of 63 cents per 1,000 cu. ft. These prices are subject to a 3-cent discount if the bill is paid within ten days. A minimum charge of 90 cents is agreed upon. Churches, parsonages and charitable institutions are given an additional 3-cent discount. The old rate was 35 cents per 1,000 cu. ft. net.

Gas Repairs Made Without Inconvenience to Consumers

The Orange County Public Service Corporation, under the direction of General Superintendent F. A. Hawkins, completed repairs to the gas plant in Port Jervis, N. Y., without any inconvenience to its patrons. The men worked all night. A new top was placed on one of the big cylinders, and other repairs made so that the gas-making apparatus is now in excellent working order.

File 80-Cent Gas Appeal

Papers in an appeal taken by the Public Service Commission and the Attorney General from the decision of the Federal Court restraining them from seeking to enforce the 80-cent gas law against the Brooklyn Union Gas Company, Brooklyn, N. Y., and permitting the company to charge 97 cents per 1,000 cu. ft. for gas, pending the suit of the company have been filed with the United States Circuit Court.

It is contended in the appeal that the company has no standing in a court of equity because it failed to prove that it had complied with all the requirements of the law. It is further contended that the company earned a fair return upon its investment during the last ten years, and that the lower court erred in not taking into consideration the average annual earnings of the company for a period of years.

Dallas Gas Company Return 7.97 Per Cent

A rate of return equivalent to 7.97 per cent of the permitted property value was realized by the Dallas Gas Company, Dallas, Texas, during the first two years of operation under the franchise, Grover C. Bland, chief accountant to the Supervisor of Public Utilities, said in his report on the company's operations during that period.

"The total net earnings for the twelve months ended Jan. 31, 1919, were $235,858.80, equivalent to a rate of return of 8.56 per cent per annum.

"The total net earnings for the twelve months ended Jan. 31, 1920, were $210,468.04, equivalent to a rate of return of 7.40 per cent. The total net earnings for the two years of operation under the franchise, from Feb. 1, 1918, to Jan. 31, 1920, amount to $446,326.84, or a 7.97 per cent rate of return, as against the permitted return of 8 per cent. Of the total net earnings for the two years, approximately one-half was derived from boiler gas sales.

"The net earnings of the company for the twelve months immediately preceding beginning of operation under the new franchise were $134,-170.47, or about 5 per cent on the then property value. The fact that the earnings of the company have been higher since the franchise went into effect has been due largely to the very large increase in boiler gas sales."

Brooklyn Borough Gas Company Given Right to Increase Rates

The Brooklyn Borough Gas Company, Brooklyn, N. Y., has been granted the right by the Public Service Commission to increase its rate for gas from $1.10 to $1.15 for the remainder of the current year. The application of the company for a rate of $1.25 per 1,000 ft. was refused.

In denying the company's application, Commissioner Nixon, who acted upon an opinion and recommendations by Commissioner Alfred M. Barrett, found that the company had met with extraordinary expenses in the conduct of its business and was entitled to an increase of a few cents over its present rate. He thereupon permitted the company to make its new rate, beginning April 1, $1.15, instead of $1.10. This rate will continue until the end of the current year, when it will again be subject to revision and, if conditions warrant, may be reduced downward.

The present order is a revision of the order issued by the commission in December, 1918, following the decision of Judge Hughes that the rate as prevailing was confiscatory. The commission then held that the company was entitled to $1.10 per 1,000 cu. ft. and that such should be the rate during 1919. Later in 1919 the company asked permission to permit it to charge $1.25 per 1,000 cu. ft. This application was taken under consideration at hearings which have been held by Commissioner Barrett during the past three months. In the meantime the rate of $1.10 per 1,000 ft. has been continued, pending the termination of the hearings.

"I think that in fixing a rate for the future," said Commissioner Barrett in his recommendations to Commissioner Nixon, "the commission should not proceed upon the assumption that costs will remain the same in 1920 as in 1919. There is always the possibility of increased costs of labor and material which cannot be foreseen.

"The Brooklyn Borough Gas Company is enjoying the benefit of a low price for gas oil at present, but this price will continue only until Aug. 1, 1920, after which date the company probably will have to pay more for oil than it paid at any time during 1919," Commissioner Barrett continued.

"I do not think, however, that the evidence warrants an increase of the rate to $1.25, which is the rate desired by the company. In view of the circumstances, I am of the opinion that, having due regard, among other things, to a reasonable average return upon capital actually expended and to the necessity of making reservations out of income for surplus and contingencies, the rate of $1.15 for the nine months from April 1, 1920, to Dec. 31, 1920, both inclusive, would be ample. If, at the end of that time, any change is deemed necessary or proper, it can be made, either on complaint of the company or its consumers, or on the initiative of the commission. If, on the other hand, no change in the rate is regarded as necessary or proper, the rate of $1.15 will continue in effect indefinitely by operation of law, but, under the law, will be subject to change at any time."

More About the Natural Gas Association Convention

With the third largest mechanical exhibit in the United States, the fifteenth annual convention of the Natural Gas Association of America and the Association of Natural Gas Supply Men will be held in Buffalo, N. Y., May 17 to 20, inclusive.

In many respects the exhibition will be unique. It is the first time in the history of the joint associations that the object of the show has been predicated on the desire to educate the public in the economical finding, transmission and utilization of natural gas.

Chief among the exhibits, and a direct outgrowth of the recent interest shown by the Department of the Interior in the conservation of natural gas, will be an educational demonstration of efficient cooking appliances—stoves, burners and meters showing different pressures—staged by the U. S. Bureau of Mines, with Miss Olga A. Elifritz, recently appointed demonstrator of the Bureau of Mines, in charge.

Exhibits will comprise everything in which natural gas is used, from a gas mantle to a revolving mechanical bakery; and everything in appliances from gas pipe to a complete well-drilling outfit.

B. C. Oliphant, of Buffalo, president of the Natural Gas Association of America, declared that the Buffalo show this year will be the largest ever held by the joint associations, and he confidently expects that the Cleveland registration of 1,850 delegates last year, will be exceeded by at least 500 at Buffalo.

Proposed Merger of Iroquois and Buffalo Gas Companies

The city council has referred to committee a communication from Bert C. Oliphant, of the Iroquois Natural Gas Company, proposing a merger of the Iroquois Company with the Buffalo (N. Y.) Gas Company to supply a mixture of natural and manufactured gas.

Admitting the company failed to supply natural gas in sufficient quantity during the cold weather and that, present conditions continuing, its supply of gas will be exhausted in ten years, the council is asked to cooperate to obtain the merger. A gas manufacturing plant would be erected at a cost of several million dollars.

Natural gas costs 35 cents per 1,000 ft. and manufactured gas $1.45. Reductions in both prices have been ordered by the public service commission and both cases are pending appeal. What the cost of mixed gas would be was not disclosed in the communication to the council, being given as in between the two present prices.

Students of the Buffalo gas situation have advised that mixed gas is the only solution of the problem.

An initial expenditure of about $2,000,000 will be necessary, President Oliphant said, to install mixers and other required equipment. After that a new manufacturing plant will be contemplated, according to the communication to the council.

April Meeting of Illuminating Engineering Society

The April meeting of the Illuminating Engineering Society will be held on Thursday evening, April 8, at 8 p. m. in the Engineering Society Building, 29 West Thirty-ninth St., New York City.

The papers to be read are "Searchlights in the A. E. F.," by Doraf Wilmot Blakeslee, formerly first lieutenant, 56th Engineers, A. E. F., and "Historical Sketch of Street Lighting," by P. S. Millar, of the Electrical Testing Laboratories.

West Shore Gas Company Proposes Increase

The West Shore Gas Company, Nyack, N. Y., under a tariff filed with the Public Service Commission, proposes as effective on April 25, in Haverstraw and West Haverstraw, an increase in the rate of gas from $1.75 to $2.50 a 1,000 cu. ft.

Books as Tools

The American employer, still striving to overcome the many unusual business and financial conditions which have followed in the wake of the war, is becoming more and more convinced that among the most serious features of his problems are a pronounced shortage of labor and a dearth of workers skillful to the point of high proficiency.

The quantity demands of the war period no longer are maintained in many industries, and the American employer soon must face a sharp foreign competition. However, he is not losing sight of the fact that, in the long run, quality rather than quantity will stabilize "Made in America" goods in the markets of the world. But, to do this, the native manufacturer must obtain employees who are thoroughly capable, that the products of the United States may equal in every way the best produced abroad.

How can he obtain this much desired efficiency on the part of his employees?

To this query there are many answers, but there is no question that one solution of this difficulty points straight to the magic gateway to erudition—books. Already, in line with this thought, many far-seeing manufacturers and heads of business institutions have installed in their plants special libraries of technical books for the use of their workers, as well as for reference by themselves. From such libraries the worker may obtain books giving the most minute information upon the industry in which he is employed, and such books are in demand both during the lunch hour and for quiet reading at home. This plan is not a tentative scheme, but an established fact, and in such places as it has been followed it has met with the greatest favor on the part of both the employer and the worker. Many of the greatest commercial and business institutions in the United States have found that the installation of a special library of technical books was a wise step.

But there still is a deplorable lack of good libraries in business houses, shops, mills and manufacturies when the country is considered as a whole. Every employer should be brought to see the benefits to be derived from these special libraries, and an important step toward this end has been taken by the American Library Association with its peace-time Enlarged Program, which is being carried out with the significant slogan, "Books for Everybody."

In the war the American Library Association supplied to the men in service, both here and overseas, more than 7,000,000 books. After the armistice it began arranging for an amplified peace-time effort, which more recently has developed into a movement now known as the Enlarged Program.

The Enlarged Program contemplates doing many things toward an even more general extension of the library service, emphasizing four outstanding features. One of these, and a very important one indeed, is with the aid of the Special Libraries Association to encourage a larger use of the technical books now in the public libraries and to urge employers of labor in factories and plants to install special libraries of technical books for the use of their employees. The A. L. A. also will endeavor to bring about the extension of the county library system now successfully in operation in a number of States, to all parts of the country that the dwellers in even the smallest hamlets may be brought in intimate touch with the newest and best books.

The American Library Association was organized forty-four years ago and has a membership of 4,000 active librarians. It will carry out its Enlarged Program in close co-operation with public libraries, library commissions and the Special Libraries Associations. These agencies already have done much toward encouraging the use of technical books by the men and women who have the most to gain by reading them and will continue their endeavors indefinitely. These agencies, however, earnestly seek the support of every employer throughout the country, that the effort may be successful.

Ware Company Raises Gas Rates 28 Per Cent

Gas consumers will have to pay a 28 per cent increase starting April 1, according to a notice issued by the Ware (Mass.) Gas Light Company which states that it is with regret that the company announces that it will be necessary to advance the price from $1.75 per 1,000 ft. to $2.25 for all consumers using under 20,000 ft. a month and an increase to $2.15 for those using over 20,000 ft.

The announcement says the advance is made because of increased cost of labor, due to a change in working hours at the works, and also to the large advance in price of coal and other material entering into cost of manufacture.

Will Standardize Gas Service in North Carolina

Through representatives of the Bureau of Standards at Washington, the State Corporation Commission expects to standardize the gas service furnished by the companies in North Carolina. The commission has taken the matter up with A. L. Phillips, of the bureau, and he has agreed to send men into the State for the purpose of investigating the quality of the gas now being produced by every gas company in North Carolina as well as the service being rendered.

The quality of the service is the main point in contest in the case which is now pending from Winston-Salem. The Winston-Salem Gas Company contends that it is impossible to furnish a better grade of service unless more revenue is obtained through increased rates. The city of Winston-Salem claims that the patrons of the gas company are not willing to pay the increased rates until it is represented to them that they will be given better service and a better grade of gas.

With a set of uniform regulations which the commission will receive from the information and suggestions furnished it by the bureau experts, it is pointed out that something tangible will be at hand upon which the Winston-Salem case and other cases of a similar nature may be decided. If this schedule is adopted by the commission it will be made applicable to all gas companies in the State.

Wakefield to Discontinue Municipal Gas Plant

Following a report that the municipal lighting plant had been operated at a loss of $134,000 since the town bought the plant, the voters have instructed the Municipal Lighting Commission of Wakefield, Mass., to purchase gas as soon as a suitable contract can be made.

A special committee which investigated the plant with the prospect of selling the plant reported that the town is paying considerably more for gas than nearby communities and that the gas plant of the Municipal Lighting Department lost $4,000 last year.

By-Product Coke Plant Ready for Operation

The by-product coke ovens of the Birmingham Coke & By-Products Corporation, near Boyles, Ala., will go in operation in about a week, according to a statement of President Morris W. Bush. All that has prevented earlier operations has been the lack of a sufficient supply of coal, which could not be delivered at the plant on account of the car shortage.

This battery of by-product ovens has been under construction since the fall of 1918, work at times being retarded by the lack of labor and failure of delivery of materials.

Mr. Bush stated that in a comparatively short time there would be enough coal in the yards to supply the ovens for several weeks.

Temporary Increase Granted Oklahoma Gas Company

Permission to increase gas charges eight cents for each 1,000 cu. ft., effective March 15, has been granted to all companies distributing gas supplied by the Oklahoma Natural Gas Company, Oklahoma City, Okla., in a temporary order issued by the State Corporation Commission at the request of the company and a committee of Oklahoma City residents. The increase will make the rate for gas supplied for domestic uses 48 cents for 1,000 cu. ft. instead of 40 cents.

The increase is for the purpose of enabling the gas company to purchase gas in the Cushing Field, which has formerly been bought by the Empire Gas Company, for distribution in Kansas at a higher rate than that charged in Oklahoma, the commission stated. The contract with the Kansas company has expired, and to enable the Oklahoma to obtain the gas placed on the market on that account prompt action by the commission was necessary.

Increase of Gas Company Stock Authorized

At a special meeting of the stockholders of the New Bedford Gas & Edison Light Company, New Bedford, Mass., the recommendation of the directors that an increase of $477,000 in the capital stock of the company be authorized, together with the issuance of $477,000 worth of 6 per cent mortgage bonds maturing in 1928, was adopted by a large majority of the votes cast.

Mr. Prescott, president of the company, said that the proposed financing will not by any means take care of all of the expenses which the company is incurring in making enlargements. If the recommendations of the directors are approved, he said, the company will have outstanding $1,500,000 of mortgage bonds maturing in 1922 and $1,332,000 worth of mortgage bonds maturing in 1928. This will leave the company with about $2,000,000 of debt that is not funded, he said, and the directors proposed to finance this temporarily by issuing short term notes.

Lone Star Company's Earnings Show Return of 7.27 Per Cent

Gas operations of the Lone Star Gas Company netted a return equivalent to 7.27 per cent per annum on its property value of $6,723,287.53, according to the report made after an audit of the company's books by Grover C. Bland, chief accountant to the Supervisor of Public Utilities. The report covers the period of operations for twelve months ending Nov. 30, 1919.

The average rate of return from all operations of the company, as shown by the report, for the period from June, 1909, to December, 1918, would be approximately the same as shown by the report of Edward W. Bemis, of Chicago, in 1916. At that time the company's dividend over a period of six years amounted to 25.50 per cent in cash on property value and 25.39 per cent in stocks, making an average of something like 9.50 per cent per annum, when an addition of the $471,022.09 surplus and undivided profits was made.

Personal Notes

ALFRED B. EATON, for twenty-four years Western sales representative of the United Gas Improvement Company, died in Philadelphia, on March 24th. Mr. Eaton was born at Buffalo, N. Y., Oct. 19, 1864, educated in Detroit and entered the employ of the Chicago branch of the Pennsylvania Globe Gas Light Company in 1890. He was appointed Western sales representative of the United Gas Improvement Company, April 7, 1896, making his headquarters in Chicago. He was a member of the American, Illinois, Indiana, Michigan and Wisconsin gas associations.

Mr. Eaton was a well-known figure at all gas men's gatherings and was a leader, not only on account of his courteous manners, but by reason of his willingness at all times to contribute to the cheerful entertainment of his friends. He was first taken sick last December and went to Miami, Fla. Early in March he was taken to the Jefferson Hospital in Philadelphia, where his death occurred.

R. W. JOHNSTON, new business manager of the Minneapolis Gas Light Company, Minneapolis, Minn., has resigned his position, to take effect April 1, to become sales manager of the Hoffman Heater Company, of Lorain, Ohio.

Mr. Johnston's experience in the gas business dates back over a period of twelve years, and during that time he has held various positions with the company, which have led to a good insight into the business, and after serving as superintendent of sales, was promoted to purchasing agent, which place he occupied during the war, and was then again put in charge of new business.

H. C. HIGGINS has been appointed manager of the Wausau (Wis.) Gas Company to succeed H. H. Wilson, who has resigned to take a position with the Wisconsin Railroad Commission.

CHARLES HUBBARD JOHNSON, for fifty years cashier of the Boston Gaslight Company, died to-day at his home, 84 Grove Street, Auburndale. Mr. Johnson, who was ninety-one years old, was the oldest resident of Auburndale.

Born in Boston, Nov. 23, 1828, he entered the employ of the Boston Gaslight Company on Jan. 17, 1853, being advanced to the position of cashier in May, 1868. He retired in 1918 on full pay. Mr. Johnson was a profit-sharer in the company.

H. H. WILSON has tendered his resignation as manager of the Wausau (Wis.) Gas Company to accept a position in the accounting department of the Wisconsin Railroad Commission. H. C. Higgins, Chicago, will suceed him at Wausau.

Use of Gas in Manufacture of Carbon Black Discussed at Meeting of Natural Gas Conservation Committee

That the interests of the entire printing industry of the United States, including newspapers, magazines and books, were largely dependent for their future supplies of printing ink on the rapidly diminishing supplies of natural gas, was brought out before the Natural Gas Conservation Committee, of which Director Van H. Manning, of the Bureau of Mines, is chairman, at their meeting last week in Washington.

Speaking in defense of the use of natural gas for the manufacture of carbon black, Reed L. Carr, of New York, representing 40 per cent of the carbon black interests of the country, declared that carbon black was at once the cheapest and best known color base for printing inks, carbon paper, black typewriter ribbons, and was essential in the finest grade of phonographic records, and the highest grade automobile tires.

"One pound of carbon black," said Mr. Carr, "and eight pounds of mineral oil will print 2,250 sixteen-page newspapers. In the United States there are 22,000 newspapers and magazines, with a total circulation of 14 billions annually, or a circulation of 140 per capita, and employing 112,000 persons. There are 33,000 printing establishments, employing 272,000 persons, whose estimated wages amount to $685,000,000 annually."

Citing the increasing use of carbon black in the manufacture of automobile tires Mr. Carr explained that the addition of carbon black to the rubber resulted in an increase of tensile strength in the time of from 4 to 26 per cent, depending on the amount used. It also gives superior resiliency to tires. "If the addition of carbon black increases the life of a tire but 10 per cent," he added, "this would result in a saving of $80,000,000 a year to automobile owners."

Defenders of the use of natural gas in the manufacture of carbon black assert that this use of natural gas actually has been a conservation measure, in that it has resulted in some good use of the natural gas fuel, where it otherwise would have been entirely wasted. On the other hand, it is admitted that the making of carbon black is a wasteful use of this valuable fuel, but, as Mr. Carr pointed out, "no other known pigment is as smooth and free from grit and has anywhere near as great covering qualities."

"Carbon black manufacturers have followed the opening of virgin natural gas fields," said Mr. Carr. "They have had to because the short life of all natural gas fields has prevented the making of carbon black in any one field for other than a short period of time."

He told the Natural Gas Conservation Committee that the firm he represented has begun the absorption of gasoline from natural gas about three years ago; that last year they produced 1,000,000 gallons of high-grade gasoline for blending with low-grade gasoline, and in 1920 would more than double this gasoline production. The remaining natural gas is then used for the making of carbon black.

The quality of the carbon black is dependent on many factors, the higher grades of carbon black being produced by the consumption of the greatest amount of natural gas per pound of carbon black. Much of the carbon content of natural gas is not recovered as carbon black, admitted Mr. Carr, who asserted that if larger quantities of carbon black are taken from the natural gas that it results in an inferior product, and are not suitable for high-grade printing work, especially half-tones and illustrations.

This is but one of the many problems now being considered in connection with the labors of the Natural Gas Conservation Committee, which is composed of representatives of the Bureau of Mines, State Public Utilities Commissions, the consuming public and the natural gas interests.

New Gas Company Incorporated

Announcement of the formation of the Interstate Gas Company, San Diego, Cal., a corporation, the stockholders of which are to be Imperial Valley citizens, together with the old bondholders of the Imperial Valley Gas Company, has been announced just previous to a meeting of the directors of the newly organized company for the purpose of electing officers, to take over the Imperial Valley Gas Company, reconstruct the system, and give the valley a gas service such as it has desired for several years.

Prominently identified in the new organization are Benjamin Soloman, W. F. Holt, who is the only outside director; Jasper L. Travers, C. E. Paris, D. A. Leonard, cashier of the First National Bank of Imperial, and W. T. Dunn, president of the First National Bank of Brawley. These men constitute the board of directors.

In explaining the plan, W. F. Holt said, "It has been arranged with the old bondholders that they will trade their bonds for stock in the new company, so that any new stockholders will come in on an equal footing with the old bondholders. In addition, according to our estimates, it will take $125,000 to put the plant in first class condition."

Elect Officers of New Kansas City Gas Company

At the first meeting since taking over the property the directors of the reorganized Kansas City Gas Company, Kansas City, Mo., elected Charles W. Green, former mayor of Kansas City, Kans., vice-president and assistant treasurer. At the same time George E. Nicholson, W. S. McLucas and Michael J. Barry were made president, treasurer and secretary, respectively, confirming a temporary election of the latter made at the last meeting.

Mr. Green, it is said, will be the active administrative head of the company, assuming the duties of general manager, although that office has not been created by the gas company.

Old Colony Gas Company Announces Increased Rates

The Old Colony Gas Company, East Braintree, Mass., announces an increase in price of gas, effective April 1, to $2 per 1,000 cu. ft. for the first 5,000 cu. ft. consumed each month. A scale of increased discounts have been arranged to offset the advance.

Asks Half-Million Increase in Capitalization

To meet an issue of notes due May 1 for construction work, the Bridgeport (Conn.) Gas Light Company expects to increase its capitalization $500,000. The present capitalization is $2,000,000.

THE PACIFIC GAS & ELECTRIC COMPANY, at a meeting of the directors, declared the regular quarterly dividend of $1.25 a share on the common stock, payable April 15, on stock of record March 31.

Construction Notes

Leominster Gas Company to Erect Generator Costing $100,000

Contracts have been practically awarded for extensive additions to the plant of the Leominster Gas Light Company that will give the city one of the best, if not the best, and most up-to-date plants in Massachusetts, and one that will more than quadruple the output. Superintendent E. O. Wedge has the plans for the new building that is to be erected on the present site, between the storage and generating plants. It is to be a generator, 1½ stories in height, of brick, with ground dimensions of 52 by 34 ft. and will have a capacity for generating 50,000 cu. ft. of gas per hour each day, while the present generating capacity, with two generators, is but 180,000 cu. ft. per day. The estimated cost is $100,000. From seven to ten miles of mains are to be laid and next year, or in the near future, plans have been formulated for another addition in the shape of a 600,000-cu. ft. tank for storage purposes.

Texas Company to Use Petroleum Coke in Manufacture of Water Gas

The Port Arthur (Texas) Gas & Power Company is installing an 8-ft. water gas set, and petroleum coke will be used in the generator, as Port Arthur has oil refineries producing petroleum coke which is an excellent product to use in connection with water gas manufacture. The 8-ft. set will be installed alongside of the old 5-ft. 6-in. set furnished by the Gas Machinery Company at Port Arthur a few years ago.

St. Clair County G. & E. Co. Installing New Apparatus

An 8-ft. 6-in. water gas set will be installed for the St. Clair County Gas & Electric Company, East St. Louis, Ill., to be used in connection with the two 8-ft. 6-in. sets installed by the Gas Machinery Company a few years ago, and which 8-ft. 6-in. sets have been successfully operated, using soft coal in the generator for a continuous period of about eight years.

Big Improvements Planned by Winston-Salem Co.

Improvements involving an expenditure of $150,000 will be made in Winston-Salem, N. C., by the Winston-Salem Gas Company within the next few months, according to an announcement by the local manager, Mr. Clay. W. E. Morse, president of the company operating the Winston-Salem Gas Company, has been in the city for several days conferring with Manager Clay, and arrangements have been made to begin the improvements within the next three weeks. Mr. Clay gave out the following statement:

"Our company is anticipating the immediate installation of equipment which will give the local plant a capacity increase of 25 per cent, which will mean that the company is providing for a plant capacity which will provide 75 per cent more gas than the city is now consuming. The most modern equipment is being purchased, including the most efficient scrubbing and purifying apparatus.

"We have let the contract for the immediate erection of a 300,000 cu. ft. gas tank, which, in connection with the present storage, will give the city a surplus to meet demands for thirty-six hours in case of accident which might cause a shutdown of the generating equipment. The tank will also better enable us to maintain a uniform pressure at all hours.

"Considerable feeder main extension is contemplated and is being arranged for. A 16-in. feeder main will be extended from the new storage tank into the heart of the business district."

New Office Building for Meriden Gas Light Company

The new office building, which Lewis A. Miller is to construct for the Meriden Gas Light Company, Meriden, Conn., to be used by the gas company and the Meriden Electric Light Company for office purposes, will be a very handsome building, and one well adapted to the uses for which it is intended.

The building will have a frontage of 48 ft. on West Main Street, and a depth of 100 ft. The construction of the front will be of yellow limestone upon granite bases, with large plate glass show windows set in copper. In the rear the walls will be of brick. The plans for the building have been drawn by Architect Charles S. Palmer, and when completed the building will compare favorably with the offices of lighting companies in other cities.

The main salesroom will be 46 by 40 ft. in size, giving 1,840 square ft. of floor space for the display of gas and electric fixtures, etc. At the north end of the salesroom, in the center, will be the cashier's office, surrounded by a suitable grille work cage. To the left of the cashier will be the telephone exchange and coke sales department. Next west from this will be the sales counter, with shelves for the convenient storage of small articles of merchandise, such as electric light bulbs, gas mantles, burners, etc.

In the basement there will be a large storage room for goods of the general stock in trade of the two companies, and under the sidewalks will be a transformer and meter room, in which will be located the instruments for the new building, as well as those for the surrounding buildings. It is expected the new building will be ready for occupancy before the first of next year, work on the foundation having already been begun.

New Gas Tank for Coast Counties Company

The smaller of the two gas tanks at the Coast Counties Gas & Electric Company's station at Hollister, Cal., is being torn out to make room for a new steel tank. The new tank will hold 8,000 cu. ft., the old tank being of the same capacity.

Madison Company Gives Contract for Water Gas Set

The Madison (Wis.) Gas & Electric Company has awarded a contract to the Gas Machinery Company to install a new 10-ft. water gas set of latest design in the same building and alongside of the 8-ft. 6-in. water gas set formerly furnished by the Gas Machinery Company at Madison, and for which space was provided in the same building.

New Five-Ft. Generator Apparatus for Mt. Clemens Company

A new 5-ft. generator apparatus is being installed by the Gas Machinery Company in the Mt. Clemens Gas Light Company, Mt. Clemens,

Mich., to be used in connection with the coal gas plant and as an auxiliary thereof.

Chicago Heights Company to Have New Water Gas Set

A new 7-ft. water gas set will be installed in the existing generator house of the Chicago Heights Gas Company by the Gas Machinery Company, by taking out a small set that is now in place and locating the new 7-ft. set alongside of the present 6-ft. 6-in. set. This will give Chicago Heights ample water gas capacity to continue the efficient service they have given in the past.

Lowell Gaslight Co. Asks $200,000 Stock Issue

At a meeting of the stockholders of the Lowell Gaslight Company, Lowell, Mass., it was voted to apply to the Public Utilities Commission for permission to increase the capital stock to the amount of $200,000. The new stock is to be sold for $150 a share, netting the company a total of $300,000. The purpose of the issue is to meet notes to the amount of $400,000 that mature next November. The balance of $100,000 will, presumably, be raised by loan.

Some idea of the remarkable growth of this concern, which, incidentally, reflects the growth of the city, may be gained by the fact that this company was established in 1849 with an authorized capital of $300,000, only $80,000 of which was paid in. To-day it is capitalized at $1,000,000, with a prospect that this capitalization may be increased by $200,000 during the current year.

Commission Approves Sale of Gas Properties

The sale of the Santa Barbara and San Luis Obispo County, Cal., gas properties of the Midland Counties Public Service Corporation to the Santa Maria Gas & Power Company has been approved by the Railroad Commission. The order also gives the Santa Maria Company authority to charge the customers obtained through this purchase the same gas rate it has been collecting from its own customers, which is higher than that charged by the Midland Company. The price was $388,000. The Midland Company has announced its intention to use the funds received from the sale to extend and improve its service.

Earnings of Massachusetts Gas Companies

The combined net earnings available for dividends of the subsidiary companies of the Massachusetts Gas Companies for February were $210,265, a decrease of $85,567, or 28.92 per cent compared with the corresponding month a year ago.

The February earnings compare as below:

	1920.	1919.	1918.
Boston Gas	$100,461	$121,821	$111,288
East Boston Gas	6,009	1,291	2,021
City Gas Light	3,693	5,147	2,895
Newton & Wat. Gas	12,431	7,611	10,593
Total	$122,594	$133,188	$126,798
N. E. Coal & Coke	7,866	1,350	37,310
N. E. Fuel & Trans	79,804	163,993	126,205
Total	$87,670	$162,543	$163,516
Grand total	$210,265	$295,832	$290,314

Rock Island Gas Company Asks Increased Rate

The Peoples' Power Company, furnishing electricity and gas to Rock Island, Moline and East Moline, Ill., has applied to the Illinois Public Utilities Commission for permission to increase its gas rate approximately 20 per cent. The present rate is $1 per 1,000 cu. ft.

Atlantic Gulf Oil Corporation

Incorporated under laws of Virginia. Officers: President, Joseph F. Guffey; vice-president, William H. Zahnizer; secretary-treasurer, A. R. Nicol.

At the present time the Atlantic Gulf Oil Corporation has three producing wells in Mexico. These wells have an estimated potential production in excess of 250,000 barrels daily, and one of them undoubtedly is the largest producing well in the world.

In addition to the 1,200 or 1,300 acres of land originally acquired by the Atlantic Gulf Oil Corporation through total ownership in subsidiary companies, it has secured additional desirable leases on approximately 35,000 acres in the most promising producing area in Mexico.

The company is now engaged in the construction of 35 miles of 10-in. pipe line—which will be looped, giving a net ultimate capacity of 60,000 barrels a day—from the wells in the field to the loading terminals at Tecomate. In the field they are erecting ten large pump stations, each having two pumps capable of pumping 40,000 barrels per day. At the terminal they are erecting a mammouth pumping station with a capacity of pumping 6,000 barrels per hour on board the tankers. They are also erecting twelve 55,000-barrel storage tanks for crude oil and installing four 10-in. lines from the station to the two loading berths for tankers distant about 4,300 ft. from shore. It is generally conceded that the terminal of the Atlantic Gulf Oil Corporation at Tecomate is the most desirable one along the entire coast. There is under construction at the present time a topping plant at the terminal, having a capacity of 39,000 barrels per day.

Annual Report of Beaumont Gas Light Company

Operating expenses of the Beaumont Gas Light Company, Beaumont, Texas, during the year of 1919 approximated $230,333, according to a report of that concern filed with city officials.

The report also shows that the gas company has over a million dollars tied up in the future of the city.

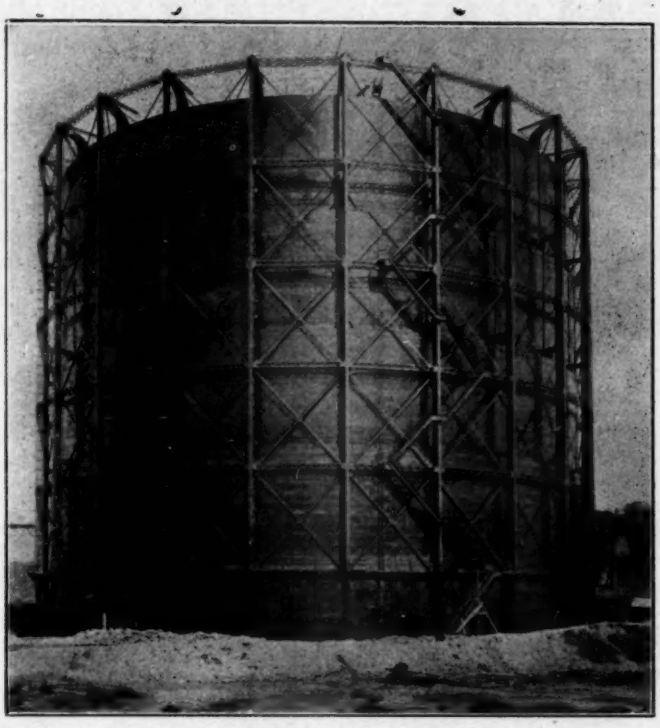
Of the authorized capital stock of $750,000, a half million dollars have been issued and there is a bonded debt of $685,200. Gross earnings of the company last year amounted to $195,206.

THE LYNN GAS & ELECTRIC EMPLOYEES' ASSOCIATION recently held its annual smoker in the rooms of the association, 16 Broad Street, Lynn, Mass. Over 150 were in attendance and among them were many prominent officials of the company. The committee in charge was Amos Muise, chairman; John Curtin, president of the association; Harry Sears and Ernest Murray.

RITER-CONLEY CO.

PITTSBURGH, PA.

PURIFYING BOXES



STEEL TANKS

BUILDERS OF

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STEEL CONSTRUCTION OF ALL KINDS

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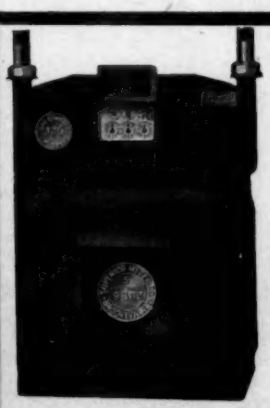
Washington New York Boston Syracuse San Francisco



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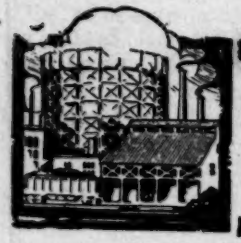
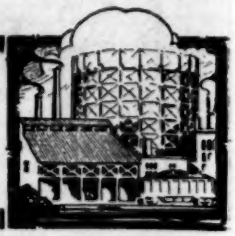


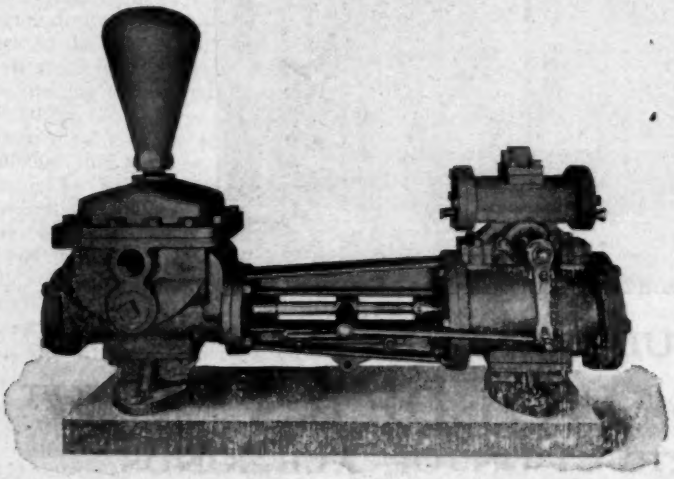
With The Equipment & Appliance Manufacturers



Conducted by Business Department of American Gas Engineering Journal

Gas Works Pump, Adapted for Oil, Tar and Ammoniacal Liquors, Etc.

The M. T. Davidson Company, 154 Nassau Street, New York, build the "Davidson Light Service Pump" for gas works, which is specially adapted for pumping oil, tar, ammoniacal liquors, etc. This pump is of the single cylinder type, positive in its operation, and will start from any point of the stroke, and make its full stroke under all conditions. It gives a steady and uniform delivery under light or heavy pressures, low or high speeds.



DAVIDSON SINGLE CYLINDER PUMP

The cylinders, steam chest, intermediate, etc., are made of hard close-grained, gray iron castings. The water cylinder lining, piston, valve seats, stems and stuffing boxes are made of high-grade bronze composition.

Specially Designed Tanks for All Purposes Around Gas Plant

The Chicago Bridge & Iron Works, Chicago, Ill., in a catalog entitled "Steel Storage Tanks and Plate Metal Work," show illustrations of a large variety of steel tanks, including acid tanks, benzine tanks, benzol tanks, chemical tanks, cooling stations, gasholders, oil tanks, etc. They state that they make a specialty of elevated tank construction, and design tanks to meet any requirements. A copy of this catalog will be sent to gas companies on request.

Handy Tool Around Gas Plant

Paul W. Koch & Co., Chicago, Ill., recently issued a leaflet describing the "Jiffy Adjustable Cutter" for cutting holes. The Jiffy Cutter is designed for cutting perfectly round holes through practically any material from paper to steel. It will cut through both metal and wood with the same set of knives. It will cut holes 1¼ to 6½ in. in diameter in wood, sheet metal, cast iron, boilers, tanks, cabinets, steel, fiber, slate or asbestos board. It is light and portable, so it can be easily carried in the tool kit, and can be used in any position—on the floor or overhead, in corners or in the open. Several of its uses are illustrated in the leaflet which will be mailed on request.

A Treatise on Paint for Industrial Plants

The Cheesman-Elliot Co., Inc.; 100 William Street, New York, recently issued a catalogue entitled "Technical Paints for Industrial Plants." It is thumb indexed for ready reference, and the foreword states, "This booklet conveys concisely our recommendations for suitable paints for every class of work usually encountered in industrial plants." A brief outline of the principal ingredients used in the manufacture of paints, with a statement of the chief merits or defects of each is given under a title, "The Composition of Paints." A chapter is devoted to "Gas Holder Paints," in which they give the spreading capacity in square feet per gallon for priming, finishing coats, and also for guide frames.

Chapters are devoted to stocks, boiler fronts and flues, exterior concrete and stucco, machinery, service pipes, radiators, steam pipes, brick work, etc.

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